FIRST QUARTER 2020 GROUNDWATER ASSESSMENT MONITORING REPORT FEBRUARY 2020 MONITORING EVENT

FORMER ENVIRONMENTAL WASTE SOLUTIONS (EWS) CAMDEN CLASS II LANDFILL

TDSWM PERMIT NUMBER IDL 03-0212 (TERMINATED) 200 OMAR CIRCLE CAMDEN, TN 38320

Prepared for:
THE TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION

FORMER ENVIRONMENTAL WASTE SOLUTIONS CAMDEN CLASS II LANDFILL

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CEC PROJECT 181-364

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EXECUTIVE SUMMARY

This report documents the first quarter 2020 assessment-monitoring event, which was performed at the former Environmental Waste Solutions, LLC (EWS) Camden Class II Landfill on February 27, 2020.

The former EWS Camden Class II Landfill is located in Benton County at 200 Omar Circle, Camden, Tennessee (latitude 36°03'16" N/longitude -88°05'16" W), and was formerly registered with the Tennessee Division of Solid Waste Management (DSWM) with permit number IDL 03-0212 and previously received secondary aluminum smelter waste for disposal including aluminum dross, salt cakes, and other industrial wastes. The IDL 03-0212 permit was terminated in July 2017.

Beginning in 2008, the site entered into the Groundwater Detection-Monitoring Program, and groundwater samples were collected from site monitoring wells on a semi-annual basis. EWS entered the Assessment Monitoring Program because of chloride concentrations reported above the 250 mg/l EPA secondary drinking water standard (2DWS) at monitoring well MW-3 during the November 2015 semi-annual detection-monitoring event. As a result, additional groundwater quality assessment activities were completed which included the installation of a new permanent groundwater monitoring well (MW-5), the installation of three (3) temporary monitoring wells (TMW-1, TMW-2, TMW-3), and completion of a private water-use survey. In addition, the semi-annual detection monitoring frequency was increased from semi-annual to quarterly assessment monitoring. The observed chloride concentration at MW-3 during this February 2020 event (17.8 mg/l) was well below the 2DWS.

Quarterly assessment monitoring activities have been performed since the November 2015 monitoring event in general accordance with the site's Groundwater Quality Assessment Plan (GWQAP) dated March 14, 2016. During the second quarter 2017 assessment-monitoring event, total cadmium was detected above the maximum contaminant level (MCL) at MW-3, which was the first MCL exceedance for total cadmium concentrations at any well location on site. As a result, enhancements have been made to the sampling and analytical program for the site which included the addition of quarterly sampling activities to the sampling and analytical program for the site.

The 1st Quarter 2020 sampling event at the facility included the following sampling activities:

Groundwater samples were collected by CEC on February 27, 2020 from MW-1, MW-3, MW-4, MW-5, TMW-1, TMW-2, and TMW-3. A leachate sample was also collected by CEC on March 03, 2020 from the "Aluminum Processing Waste Cell (APWC)" and the "Industrial Waste Cell (IWC)" during this event. The amount of leachate produced from the IWC has been minimal since the landfill was capped, and the leachate being pumped from the IWC has been intermittent.

Pace Analytical (Pace), formerly ESC Lab Sciences, was the laboratory sub-contracted to perform the chemical analyses. Laboratory reports for the 1st quarter 2020 groundwater analyses were prepared by Pace and reported to CEC on March 6, 2020 for the groundwater samples and March 13, 2020 for the leachate samples.

The reported concentrations of chemicals detected in the groundwater monitoring wells and temporary monitoring wells were reviewed and compared against their respective U.S. EPA Maximum Contaminant Levels (MCLs) and U.S. National Secondary Drinking Water Standards (2DWS). Where primary or secondary standards weren't available (i.e., cobalt), concentrations were reviewed and compared against their EPA Regional Screening Levels (RSLs). Statistical analysis methods were used to identify whether there were any statistically significant increases (SSIs) in any site monitoring wells over background concentrations for the analyzed water quality parameters. The results of the analyses during this assessment monitoring event are summarized in the following paragraphs.

Total cadmium was detected below the MCL (0.005 mg/l) at MW-3 (0.00214 mg/l) during this February 27, 2020 monitoring event and was similar in concentration compared to the previous November 20, 2019 event (0.00157 mg/l). In addition, total cadmium was not above the MCL in the duplicate sample (0.00231 mg/l) collected at MW-3 during the February 27, 2020 monitoring event. The cadmium detections at MW-3 during this event were the only cadmium detections above the Practical Quantification Limit (PQL) at any of the groundwater monitoring locations. The statistical trend analysis for total cadmium at MW-3 does confirm an increasing trend having statistical significance when considering all current and past data for cadmium at MW-3. However, based on the Mann-Kendall trend test, no distinct statistically significant trend was identified for total cadmium concentrations at MW-3 when considering data from the past 15 sampling events since November 2016. Total cadmium was first detected above the PQL during the November 10, 2016 event (0.00177 mg/l), and was first detected above the MCL at MW-3 during the June 8, 2017 event (total cadmium at MW-3 = 0.0286 mg/l).

Although there have been elevated concentrations of total cadmium in MW-3, the cadmium levels observed in MW-3 have improved significantly since closure activities have been completed. The total cadmium concentration reported at MW-3 during this event was below the MCL for the second consecutive sampling event and was lower than the 12 consecutive sampling events completed from June 6, 2017 to September 5, 2019.

Eight SSIs were identified over background during this event. SSIs included chloride (MW-3, MW-4, MW-5, TMW-1, TMW-2, and TMW-3), total cadmium (MW-3), and sulfate (MW-3). No SSIs were identified for the fluoride concentrations at MW-3 during this event. In addition, zinc was not detected in MW-3 above the respective laboratory PQL during this event. The total cadmium, chloride, and sulfate detections observed in the site monitoring wells were all below their associated MCLs or 2DWS.

Glossary of Terms

Appendix I	Refers to the required regulatory sample list of groundwater parameters
CEC	Civil & Environmental Consultants, Inc.
Class I Landfill	Municipal Solid Waste Landfill
Class II Landfill	Industrial Waste Landfill
Class IV Landfill	Construction/Demolition Waste Landfill
Class III/IV Landfill	Landscaping and Construction/Demolition Waste Landfill
DML	Construction Demolition Landfill
US EPA	United States Environmental Protection Agency
Pace	Pace Analytical
EWS	Environmental Waste Solutions
GW	Groundwater
HDPE	High Density Polyethylene
HI	Hydrogeologic Investigation
MCL	Maximum Contaminant Level
microomhos•cm-1	micro-Siemens per centimeter
mg/l	milligrams per Liter
MW	Monitor Well
NPPL	Non-parametric prediction limit analysis
ORP	Oxidation Reduction Potential
POTW	Publically Owned Treatment Works
ppm	parts per million*
PQL	Practical Quantitation Limit
QC	Quality Control
2DWS	Secondary Drinking Water Standard (EPA)
SESD	Science and Ecosystem Support Division
SNL	Sanitary Landfill
SSI	Statistically Significant Increase
TDEC	Tennessee Department of Environment and Conservation
TDOG	Tennessee Division of Geology
TDSWM	Tennessee Division of Solid Waste Management
TOC	Top of Casing
VOC	Volatile Organic Compound

* ppm – parts per million* is equivalent to mg/l – milligrams per Liter for water samples

1.0 INTRODUCTION

1.1 SITE LOCATION

The former Camden Class II landfill is located just off Highway US 70 at 200 Omar Circle, Camden, Tennessee. The site is located on the Camden, Tennessee USGS quadrangle at north latitude 36° 03' 16" and west longitude -88° 05' 16" at an average elevation of 400 feet above mean sea level datum (MSL). The location of the facility is shown in **Appendix A – Figure 1 – Site Location Map**. The landfill footprint can be viewed in **Appendix A – Figure 2 – Potentiometric Surface Map**.

1.2 CURRENT ACTIVITIES

The former EWS Camden Class II landfill is not currently operating (i.e., the permit has been terminated) and landfill cap construction and closure activities have been completed by TDEC. Continued post-closure activities are being implemented at the facility which are intended to protect the environment and human health and include leachate pre-treatment, leachate hauling and disposal, storm water management activities, and groundwater monitoring activities.

2.0 AQUIFER CHARACTERISTICS

2.1 GEOLOGIC AND AQUIFER CHARACTERISTICS

The extensive reworking of the site because of the excavation of chert for local road and fill projects has impacted the original site geology. Based upon a review of the Tennessee Division of Geology (TDOG) Geologic Map and site observations, it appears that the site is within the Camden and Harriman Formations. It is reported by the TDOG that the Camden and Harriman Formations are lithologically identical and not enough fossils are present to form a convenient basis for subdivision.

2.1.1 Camden and Harriman Formations

The Camden and Harriman Formations are described as follows: chert, gray with specks and mottling's of very light-gray and yellowish-gray (surfaces stained pale to dark yellowish-orange), bedded and blocky (beds 2 to 8 inches thick), dense, conchoidal fracture, contains pods of white to light gray tripolitic clay, locally stained yellow and brown, and fossiliferous. Locally, especially near the top, fragments of chert are cemented into large masses and beds of breccia by dark-brown to moderate-red limonite.

Groundwater potentiometric data collected from the uppermost water-bearing zone across the entire landfill site footprint during the 1999 and 2006 hydrogeological investigations indicated that groundwater flow in the uppermost aquifer is generally to the south. Comparisons of the water bearing zone elevations to static groundwater elevations indicate an unconfined aquifer.

2.2 MONITOR WELL INTEGRITY & STATIC WATER LEVELS

The groundwater-monitoring network for the former EWS Class II Landfill currently consists of monitoring wells MW-1, MW-3, MW-4, MW-5, TMW-1, TMW-2, and TMW-3. Due to insufficient groundwater recharge volumes for sampling, MW-2 has been removed from the regular sampling network and replaced by MW-4. MW-2 is still intact and is used for potentiometric surface measurements and field parameter testing. Monitoring well MW-1 serves as an up-gradient monitoring point, while monitoring wells MW-3, MW-4, MW-5, TMW-1, TMW-2, and TMW-3 serve as down-gradient monitoring points. The temporary wells (TMW-1, TMW-2, and TMW-3) were installed with the purpose of delineating the areal extent of groundwater contamination and providing additional potentiometric interpretation. The installation of these temporary wells were in response to elevated chloride concentrations at MW-3, which were first detected during the November 2015 sampling event. In addition to providing potentiometric information for the site, these temporary wells yield groundwater samples for water-quality analyses.

The following table presents the wells that were used to develop this report.

Up-gradient Monitoring Points	Down-gradient Monitoring Points
MW-1	MW-3, MW-4, MW-5, TMW-1, TMW-2, and TMW-3

Before purging and sampling activities began, depth to water (DTW) measurements were collected at each of the above-referenced monitoring wells using an electronic water level indicator such as the Solinst® model #122 electronic water-level indicator. DTW measurements were also collected from MW-2 for potentiometric interpretation. DTW measurements were collected in the following order from first to last: MW-1, MW-5, TMW-1, TMW-2, TMW-3, MW-4, MW-2, and finally MW-3.

The integrity of each monitoring well was checked during each sampling event prior to groundwater collection. The physical condition of each wellhead was observed and noted along with the condition of all locking mechanisms for each monitoring well. Once the watertight seal was removed from the top of each monitoring well's casing, the well was allowed to equilibrate to atmospheric conditions. The water-level indicator was decontaminated in accordance with the United States Environmental Protection Agency-Science and Ecosystem Support Division (USEPA SESD) procedures for field water-level measurements in between wells and a new pair of clean nitrile gloves were donned at each monitoring location while collecting DTW measurements. The decontaminated electronic water-level indicator was slowly lowered into the well to establish the distance between the top of casing and the elevation of free groundwater. The electronic probe was capable of determining this distance to within one-hundredth of one foot (0.01 foot). The distance was written in the site-specific field book or field data sheet as DTW. Upon collection of these data, the electronic water-level indicator was removed from the monitoring well and decontaminated.

The following equation is used to determine the elevation of groundwater at each well:

Established Top of Casing Elevation – Depth to Water = Groundwater Elevation

Top of casing elevation has been determined by a licensed land surveyor and is referenced to the current Tennessee State Plane Coordinate System. The top of casing elevations for all site-monitoring wells (MW-1, MW-2, MW-3, MW-4, MW-5, TMW-1, TMW-2, and TMW-3) were updated by a licensed land surveyor on May 12, 2016. Groundwater elevations are listed in **Appendix A – Table 1 – Field Parameters & Potentiometric Data** and reflect the most recent survey.

2.3 GROUNDWATER FLOW DIRECTION

Groundwater at the landfill appears to generally flow in a southern direction towards Charlie Creek and Cane Creek. Groundwater flow in the vicinity of the former EWS Class II Landfill generally flows from a topographic high north of the landfill towards monitoring wells MW-2, MW-3, MW-4, and MW-5 and temporary monitoring wells TMW-1, TMW-2, and TMW-3, which are all down-gradient of the waste cells.

2.4 POTENTIOMETRIC GRADIENT

The potentiometric surface of the unconfined aquifer occurring beneath the former EWS Class II Landfill occurs at approximately 20.52 feet below the top of casing at the up-gradient monitor well MW-1 to approximately 9.83 feet below the top of casing at monitor well MW-4. The potentiometric gradient calculated from groundwater elevation data collected on February 27, 2020 is approximately 1.27%.

The potentiometric gradient is calculated according to the following formula:

$$\frac{\text{Highest GW. Elev. (MW-1) } \_ \text{ – Lowest GW. Elev. (MW-4)}}{\text{Horizontal Distance between the Wells}} * 100 = \text{Pot. Grad.}$$

$$\frac{(395.95) - (371.64)}{1{,}910'} * 100 = 1.27\%$$

The above calculation assumes a perpendicular gradient between the potentiometric elevations from MW-1 and MW-4. These assumptions may provide an artificially higher potentiometric gradient than is likely occurring at the site.

2.5 HYDRAULIC CONDUCTIVITY

Hydraulic conductivity estimations within the uppermost aquifer occurring beneath the landfill have not been determined at this time.

3.0 GROUNDWATER SAMPLING PROCEDURES

3.1 INSTRUMENTATION

Before purging and sampling activities began, DTW measurements were collected at each of the monitoring wells. A YSI Professional Plus® multi-parameter instrument (YSI) was used to record pH, conductivity, temperature, dissolved oxygen (DO), and oxidation-reduction potential (ORP) during groundwater sampling events at the landfill. A Hach® model 2100Q turbidity meter was used to collect turbidity readings. Each instrument was either checked against known standards or calibrated per manufacturers' specifications prior to the commencement of sampling activities.

3.2 GROUNDWATER PURGING AND COLLECTION OF FIELD PARAMETER VALUES

On November 29, 2017, dedicated submersible bladder pumps (low-flow bladder pumps) were installed in each of the groundwater monitoring wells (MW-1, MW-3, MW-4, MW-5, TMW-1, TMW-2, and TMW-3). During the December 11, 2017 sampling event, monitoring personnel for the former EWS Class II Landfill began utilizing low-flow protocols as described within the USEPA's Issue Paper EPA/540/S-95/504: Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures, April 1996. The low-flow protocols have continued to be utilized by monitoring personnel during each quarterly groundwater assessment-monitoring event since December 11, 2017. Additionally, groundwater-sampling activities were completed during this sampling event in accordance with the USEPA SESD sampling procedure -SESDPROC-301-R4 titled "Groundwater Sampling", effective April 26, 2017.

Each dedicated submersible bladder pump is of stainless steel construction, and each is equipped with a Teflon™ bladder and dedicated Teflon™-lined bonded twin polyethylene tubing (airline and water discharge line). The low-flow bladder pumps were operated by using a special control box, which controls the pressure and frequency of the pumping action and was used to adjust the flow rate of the water. The flow rate used was adjusted to minimize stress (drawdown), prevent damage to monitoring well components, and to minimize the risk of introducing sediments into the monitoring well through the well's gravel pack. Water pumped was withdrawn directly from the formation with little mixing of casing water or disturbance to the sampling zone. The initial amount of purged groundwater was collected in a clean, high-density polyethylene (HDPE) flow-through cell while measuring temperature, pH, conductivity, DO, and ORP. A turbidity meter was used to collect turbidity readings during low-flow purging activities.

The start time of purging, the parameter measurements at intervals during purging, estimated pumped volumes, depths to water for low-flow sampling, and any notes of unusual conditions were recorded during purging activities. Field parameter measurements (temperature, pH, conductivity, DO, ORP, and turbidity) were collected periodically until proper field stabilization goals had been met, which are defined by the USEPA SESD as: "for at least three consecutive measurements, the pH remains constant within 0.1 Standard Unit (SU), conductivity varies no more than 5 percent, and the turbidity has either stabilized or is below 10 Nephelometric Turbidity

Units (NTUs)". Other parameters such as DO were also measured as a purge-adequacy parameter. Normal goals for DO are 0.2 mg/l or 10% saturation, whichever is greater. Temperature and ORP were measured during purging to obtain measurements of record for these parameters for each sampling event.

During the February 27, 2020 monitoring event, a peristaltic pump was utilized during purging activities in the temporary monitoring wells (TMW-1, TMW-2, and TMW-3). According to the USEPA SESD groundwater sampling procedures, peristaltic pumps can be utilized as an alternative and acceptable method for low-flow or multiple volume purging and sampling activities.

Peristaltic pumps require three separate pieces of tubing in order to function: (1) a section of Teflon® tubing, which is lowered into the well, (2) a small section of flexible Masterflex® silicone tubing, which is installed into the peristaltic pump head, and (3) a small section of Teflon® tubing, which connects the pump head to the flow-through cell. The first section of tubing was deployed to the approximate mid-screen within the well (approximately 4 feet above the bottom of the well casing) and cut above the ground surface. The free end of the first section of tubing was connected to the flexible Masterflex® silicone tubing situated in the peristaltic pump head. Finally, the third section of tubing (second section of Teflon® tubing) connected the Masterflex® silicone tubing at the pump head to the flow-through cell for collection of field chemistry parameter measurements. In order to prevent the transfer of residuals between sampling locations, all three sections of tubing were replaced between each well. After replacement of all sections of tubing, the peristaltic pump was turned on, and a suitable (slow) pumping rate was achieved to maintain a minimal and stable drawdown level. Field parameters were collected from the initial amount of water that was purged and measurements were collected periodically until the parameters had stabilized as described above.

With respect to groundwater chemistry, an adequate purge is achieved when the pH and conductivity have stabilized and the turbidity either has stabilized or is below 10 NTUs. If the field parameters were not stable, the purging procedures continued until one of the following adequate purge conditions were met:

1. Field stabilization occurred.
2. Well was purged dry. For wells with slow recovery, attempts were made to avoid purging to dryness by slowing the purge rate. In some situations, even with slow purge rates, the well may be pumped dry. This situation generally indicates that an adequate purge had been achieved and the well was sampled following sufficient recovery (enough volume to allow filling of all sample containers).
3. A minimum of three well volumes were purged.

Field chemistry parameters were collected periodically at the temporary wells until field parameter measurements had stabilized, and at least three well volumes were removed from each temporary monitoring well. The purge water from down-gradient monitoring wells MW-3, MW-4, MW-5,

TMW-1, TMW-2, and TMW-3 were containerized and discarded into the on-site leachate collection system storage tank.

Field parameter values for each well are presented in **Table 1 – Field Parameters and Potentiometric Data in Appendix A**. A detailed account of each purge and sample procedure conducted at each monitoring well is presented in **Appendix D – CEC Standard Operating Procedures**.

3.3 GROUNDWATER SAMPLE COLLECTION & PRESERVATION

Groundwater samples were collected from monitoring wells when field parameter data indicated that stagnant water had been purged from the well and replaced by groundwater from the adjacent formation that is representative of actual aquifer conditions. Groundwater was placed in the laboratory supplied sample vessels in the following order: Appendix I organics – three (3) forty (40) mL amber glass containers preserved with hydrochloric acid (HCl); Appendix I organics EDB and DBCP– three (3) forty (40) mL clear glass containers preserved with sodium thiosulfate ($Na_2S_2O_3$); total metals (Appendix I metals, Al, Ca, Fe, K, Mg, Mn, Na, and Boron) – one (1) two-hundred fifty (250) ml HDPE container preserved with nitric acid (HNO_3); alkalinity – one (1) one-hundred (100) ml unpreserved amber glass container; bromide, chloride, nitrate, and sulfate – one (1) two-hundred fifty (250) ml unpreserved HDPE container; COD & ammonia – one (1) two-hundred fifty (250) ml HDPE jar preserved with sulfuric acid (H_2SO_4).

As described in the previous section, a peristaltic pump was used to purge temporary monitoring wells TMW-1, TMW-2, and TMW-3. Samples for organic analysis cannot be exposed to the flexible peristaltic pump-head tubing, due to the risk of contaminant sorption and/or the risk of the dissolution of organic compounds to the sample.

3.4 LEACHATE SAMPLING PROCEDURES

A leachate sample was also collected by CEC on March 3, 2020 from both the "Aluminum Processing Waste Cell (APWC)" and the "Industrial Waste Cell (IWC)". The amount of leachate produced from the IWC has been minimal since the landfill was capped, and the leachate, being pumped from the IWC, has been intermittent. The IWC leachate sample was collected from the leachate collection system associated with the industrial waste cell and was collected directly from the associated leachate collection hose within the secondary containment area before the leachate entered the IWC leachate collection tank. The APWC leachate sample was collected from the leachate collection system associated with the aluminum processing waste cell and was collected directly from the associated leachate collection hose before the leachate entered the APWC leachate collection tanks. Laboratory reports from the leachate analyses were prepared by Pace and reported to CEC on March 13, 2020. The approximate APWC and IWC leachate sample locations are shown on **Figure 2 – Potentiometric Surface Map located in Appendix A**.

3.5 QUALITY ASSURANCE AND QUALITY CONTROL

3.5.1 Field Quality Assurance and Quality Control

Field Quality Assurance and Quality Control (QA/QC) samples were collected as part of the groundwater-sampling program. Quality assurance (with internal laboratory quality controls) addresses the accuracy and repeatability of analytical results after analysis in the laboratory. Quality control addresses methods to preserve the integrity of samples in the field and during shipping to the laboratory. Quality control may be accomplished by incorporating trip blanks, field blanks, field duplicates, and equipment (rinsate) blanks into the analytical program.

A field blank and a duplicate sample were collected during this groundwater-monitoring event. CEC collected a field blank near monitoring well TMW-2 and a duplicate sample was collected from MW-3. The field blank was collected by pouring deionized water into a set of sample bottles provided by the laboratory, thereby allowing any airborne contaminants a chance to enter the field blank sample. The duplicate sample was collected by taking separate samples from within MW-3 at the same time. In addition, a laboratory supplied trip blank for VOC analysis was prepared and placed in a cooler, which was present during groundwater sampling activities. Upon the collection of the final groundwater sample, the trip blank was placed in a sample cooler and delivered to Pace for VOC analysis. No VOCs were detected above the laboratory PQL in the trip blank sample.

Pace reported the groundwater laboratory analytical results to CEC on March 6, 2020. Laboratory analytical testing of the field blank presented in the analytical report showed no indications of any constituents above the laboratory PQL. The results for the duplicate sample collected from MW-3 were similar to the original MW-3 sample results.

3.5.2 Laboratory Quality Assurance and Quality Control

In order to demonstrate that a laboratory is producing data of adequate precision, accuracy and sensitivity, it is necessary to assess all laboratory procedures at all stages from sampling to reporting. The laboratory completed specific control and assessment procedures designed to monitor, quantitatively, the accuracy and precision of specific assays. Laboratory Internal Quality Assurance (IQA) refers to the full range of practices employed to ensure that laboratory results are reliable. Internal Laboratory Quality Control (IQC) consists of the operational techniques used by the laboratory staff for continuous assessment of the quality of the results of individual analytical procedures. The specific quality-control procedures utilized by the analytical laboratory are summarized in the following table:

Quality Criteria Category	Quality Control Laboratory Methods
Precision	Laboratory duplicates at a frequency of one per matrix spike, one per laboratory control sample, and one per method blank.
Bias	Matrix spikes, laboratory control samples, method blanks at a frequency of one sample per standard batch.
Representative and Comparable Data	Adherence to standard analytical procedures, analytical methods, units of measurement, and detection limits.

The groundwater analytical report from the February 2020 event indicated that the same analyte was found in the associated laboratory blank for the detected concentrations of total Hardness (MW-1, MW5, TMW-1, APWC Leachate), Alkalinity (MW-3 duplicate sample, IWC Leachate) Chromium (MW-4, MW-5, TMW-2), Potassium (MW-5, TMW-1), and Acetone (APWC Leachate, IWC Leachate) as laboratory qualifier "B". Since the same constituent concentrations were found in the method blank, the reported concentrations (indicated as laboratory qualifier "B") may be falsely higher than the actual concentrations. The associated batch QC was outside the established quality control range for precision (laboratory qualifier "J3") and accuracy (laboratory qualifier "J4") for acetone (MW-1, MW-3, MW-4, APWC Leachate, IWC Leachate, and Field Blank). However, acetone was not detected above the laboratory PQL (<0.0500 mg/l) at MW-1, MW-3, MW-4, and Field Blank. Acetone is a common laboratory cross-contaminant. The analyte failed the method required serial dilution test and/or subsequent post-spike criteria where these failures indicate matrix interference for barium (MW-1) as laboratory qualifier "O1". The sample concentration is too high to evaluate accurate spike recoveries for Manganese (MW-1) as laboratory qualifier "V". The internal laboratory IQA and IQC results are included in the laboratory analytical reports located in **Appendix C – Laboratory Analytical Reports & Field Information Logs**.

3.6 SAMPLE CHAIN-OF-CUSTODY

A sample Chain-of-Custody (COC) traveled with the sample kit from Pace to the former EWS Class II Landfill site and back to Pace for the February 2020 sampling event. The CEC SOP 07-01-01 for maintaining sample Chain of Custody is presented in **Appendix D – CEC Standard Operating Procedures**.

4.0 LABORATORY ANALYTICAL PROCEDURES

4.1 ANALYTICAL METHODS

All laboratory analyses for the first quarter 2020 groundwater assessment-monitoring event were completed by Pace Analytical. The analytical methods chosen for these monitoring events were in full compliance with the procedures required by the DSWM and the USEPA's publication SW-846, entitled Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (3rd Edition).

The SW-846 methods used for the analysis of **groundwater and leachate samples** were as follows:

Method 6010b	Inductively Coupled Plasma (ICP) – Atomic Emission Spectrometry (Boron only)
Method 6020	ICP – Mass Spectrometry (metals)
Method 2320 B-2011	Alkalinity
Method 7470A	Mercury in Liquid Waste – Manual Cold Vapor Technique
Method 8011	1,2-dibromoethane & 1,2 dibromo-3-chloropropane by Micro-extraction and Gas Chromatography
Method 8260B	Volatile Organic Compounds by Gas Chromatograph/Mass Spectrometry
Method 9056A	Determination of Inorganic Anions by Ion Chromatography (Bromide, Chloride, Fluoride, Nitrate, and Sulfate)
Method 130.1	Hardness (colorimetric) as $CaCO_3$
Method 350.1	Ammonia Nitrogen
Method 410.4	Chemical Oxygen Demand (COD)

4.2 LABORATORY ANALYTICAL RESULTS

First quarter 2020 groundwater samples were collected by CEC on February 27, 2020. Pace performed the groundwater analysis and reported the results on March 6, 2020. A first quarter 2020 leachate sample was collected by CEC on March 3, 2020 from the "Aluminum Processing Waste Cell (APWC)" and the "Industrial Waste Processing Cell (IWC)". Pace performed the leachate analysis and reported the results on March 13, 2020.

Constituent values from all inorganic laboratory analyses for groundwater and leachate samples, along with applicable MCLs or 2DWSs, are presented in **Table 2a – Groundwater and Leachate Analytical Data in Appendix A**. Copies of the laboratory reports are located in **Appendix C – Laboratory Analytical Report & Field Information Logs**.

4.2.1 EWS Groundwater Quality Relative to the EPA Primary Drinking Water Standards

Total Arsenic was not detected above the MCL (0.01 mg/l) at up-gradient MW-1 (0.00807 mg/l) during this 1st Quarter 2020 event, which was less than the arsenic concentration reported at MW-

1 (0.0176 mg/l) during the previous 4th Quarter 2019 event, which did exceed the MCL. Arsenic has consistently been detected at similar concentrations that exceed the MCL only at up-gradient well MW-1. Arsenic was not detected above the laboratory PQL (<0.002 mg/l) in any of the down-gradient monitoring wells during this 1st quarter 2020 event, which is consistent with previous sampling events. For this site, the presence of arsenic in the local groundwater is considered to be naturally occurring, originating from deposits in the soil overburden since there is no immediate development up-gradient of MW-1.

Total Cadmium was **not** detected above the MCL (0.005 mg/l) at MW-3 during this February 27, 2020 monitoring event (total cadmium at MW-3 = 0.00214 mg/l). In addition, total cadmium was detected below the MCL in the duplicate sample collected from MW-3 during the February 27, 2020 monitoring event (total cadmium at duplicate MW-3 = 0.00231 mg/l). A summary of cadmium concentrations (total cadmium and dissolved cadmium) and turbidity values observed at MW-3 during each sampling event since May 9, 2016 is referenced in the table and graph below:

MW-3
Summary of Cadmium Concentrations and Turbidity Measurements

Date	Total Cadmium (mg/l)	Cadmium, Dissolved (mg/l)	Turbidity (NTU)
2/27/2020	**0.00214**	**NA**	**7.63**
11/20/2019	**0.00157**	**NA**	**2.11**
9/6/2019	**0.0088**	**NA**	**2.98**
6/4/2019	**0.0292**	**0.0297**	**2.98**
3/5/2019	**0.0117**	**0.0133**	**6.27**
12/4/2018	**0.144**	**0.139**	**4.77**
9/27/2018	**0.204**	**0.204**	**1.05**
9/12/2018	**0.297**	**0.320**	**1.12**
6/19/2018	**0.0312**	**0.0292**	**4.90**
3/22/2018	**0.00671**	**0.00637**	**24.3**
12/14/2017	**0.00659**	**0.00733**	**23.0**
9/28/2017	**0.00926**	**0.0102**	**18.9**
8/8/2017	**0.0113**	NA	**16.6**
6/8/2017	**0.0286**	NA	**34.8**
11/10/2016	**0.00177**	NA	**64.5**
5/9/2016	<0.001	NA	**8.39**

NA-Not Analyzed

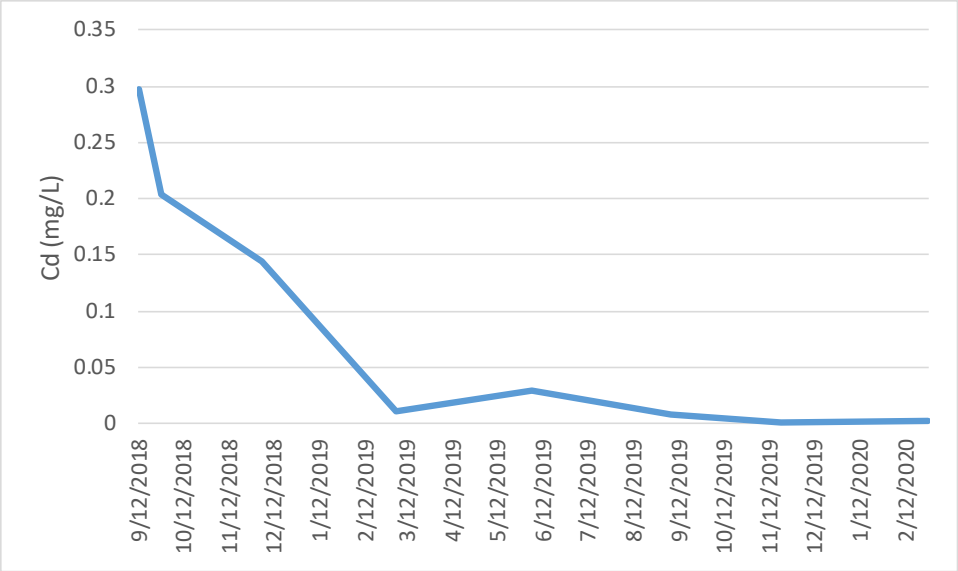


Figure – Cadmium concentrations in MW-3

Since the fall of 2018, cadmium in MW-3 continues to decrease in concentration. During the November 20, 2019 sample event, the observed cadmium concentration was at the lowest recorded level since May 9, 2016. In addition, the turbidity result for MW-3 on February 27, 2020 (7.63 NTUs) was within the recommended goal of 10 NTUs and is consistent with recent monitoring events.

Total cadmium was first detected at a level above the laboratory PQL, but at a level below the MCL (<0.005 mg/l), in MW-3 during the 4th quarter 2016 sampling event completed on November 10, 2016. Total cadmium was first detected above the MCL of 0.005 mg/l at MW-3 during the June 8, 2017 event. Although there have been elevated detections of total cadmium in MW-3 in the past, there have been no detections, as of this date, from groundwater samples extracted from any other monitoring wells at the site including monitoring wells TMW-1, TMW-2, and TMW-3, which are down-gradient from MW-3.

Total Cobalt was detected in up-gradient well MW-1 (0.0744 mg/l) and down-gradient wells MW-5 (0.00234 mg/l) during this February 2020 event. Cobalt does not have an MCL; however, the TDEC-DSWM uses the EPA regional screening level (RSL) of 0.006 mg/l as the groundwater protection standard for this constituent. The reported cobalt detection at up-gradient well MW-1 was above the RSL for cobalt during this February 2020 event. However, the reported cobalt concentration in down-gradient MW-5 was below the RSL for cobalt concentrations during this February 2020 event. Cobalt has historically been detected at concentrations that exceed the RSL at MW-1 prior to the disposal of waste in the landfill, and total cobalt was detected in MW-1 at similar concentrations during previous events. For this site, the presence of cobalt in the local groundwater is considered to be naturally occurring, originating from deposits in the soil overburden, since there is no immediate development up-gradient of MW-1.

Total Chromium was detected in MW-5 (0.00565 mg/l), TMW-1 (0.00246 mg/l), and TMW-3 (0.00234 mg/l); however, all detections did have a "B" qualifier showing that the same analyte is found in the associated blank. This may indicate that the chromium concentrations at MW-5, TMW-1, and TMW-3 may have falsely been reported higher than the actual chromium concentrations at these locations. Regardless, these reported values were not above the MCL of 0.1 mg/l for chromium in any of the wells during this February 2020 event.

Total Mercury was detected in up-gradient well MW-1 (0.000797 mg/l) during this February 2020 monitoring event, which was below the MCL of 0.002 mg/l for mercury concentrations, and also lower in concentration than the previous November 2019 event (total mercury = 0.00121 mg/l) at MW-1. Total mercury was not detected above the laboratory PQL (0.000200 mg/l) at any of the down-gradient wells during this February 2020 event. During the June 2018 event, total mercury was detected above the MCL at MW-1 (0.00319 mg/l), which was the first and only time the total mercury concentration has exceeded the MCL at MW-1. The lower limit for the 95% confidence interval about the mean for mercury at MW-1 (incorporating the mercury concentrations for the previous 10 events before the November 2019 event, using Regression on Order Statistics with 3 non-detects) was 0.0003 mg/l. This was well below the MCL for mercury. Total mercury has historically been detected above the laboratory PQL (0.0002 mg/l) at up-gradient well MW-1 at concentrations ranging from 0.00024 mg/l (February 2011) to 0.00319 mg/l (June 2018). Although total mercury has been previously detected above the PQL at up-gradient MW-1, total mercury has not been detected above the laboratory PQL in any of the down-gradient monitoring wells since monitoring began at the site in 2008. The presence of mercury in the local groundwater near up-gradient monitoring well MW-1 may be attributable to naturally occurring deposits in the soil overburden, since there is no immediate development up-gradient of MW-1. The observed concentrations of mercury at MW-1 will continue to be monitored in future monitoring events.

4.2.2 EWS Groundwater Quality Relative to the National Secondary Drinking Water Standards

Laboratory analytical results for the groundwater samples collected during the 1st quarter 2020 sampling event from the former EWS Class II Landfill groundwater monitoring well network indicated that three of the site-specific groundwater-monitoring list of compounds were detected at concentrations that exceeded the National Secondary Drinking Water Standards (2DWS). Those parameters include **aluminum** in down-gradient wells MW-3, MW-5, TMW-1, TMW-2, and TMW-3, **iron** in up-gradient well MW-1 and down-gradient wells TMW-1, TMW-2, and TMW-3, and **manganese** in up-gradient well MW-1 and down-gradient wells MW-3 and MW-5. Chloride, sulfate, and nickel detections were below the 2DWS during this event. The observed concentrations for the constituents given below are discussed relative to the 2DWS.

Total Aluminum concentrations observed in MW-3 (0.238 mg/l), MW-5 (0.214 mg/l), TMW-1 (0.382 mg/l), TMW-2 (0.439 mg/l) and TMW-3 (0.602 mg/l) during the February 2020 sampling event were above the 2DWS (0.2 mg/l). During the previous 2019 sample event, total aluminum was not detected above the PQL (<0.1 mg/l) in MW-3 and MW-5. The aluminum concentration during this event was slightly higher compared to the previous November 2019 event at well TMW-3 (0.233 mg/l). However, the total aluminum at TMW-2 during this event was lower in

concentration than the previous November 2019 sampling event at TMW-2 (0.455 mg/l). Aluminum was not detected above the PQL (<0.1 mg/l) at MW-1 or MW-4 during this February 2020 event.

The **Chloride** concentrations reported at MW-1 (1.95 mg/l), MW-3 (17.8 mg/l), MW-4 (7.87 mg/l), MW-5 (80.4 mg/l), TMW-1 (19.7 mg/l), TMW-2 (31.9 mg/l), and TMW-3 (62.0 mg/l) during this February 2020 event were below the 2DWS for chloride concentrations (250 mg/l). The chloride concentrations reported during this event are slightly lower compared to the November 2019 event at wells MW-1 (2.52 mg/l), MW-3 (19.3 mg/l), MW-4 (8.76 mg/l), and MW-5 (83.5 mg/l). The current chloride concentrations for this February 2020 event are slightly higher than the November 2019 event at wells TMW-1 (18.6 mg/l), TMW-2 (22.7 mg/l), and TMW-3 (61.1 mg/l). However, the chloride concentration at MW-3 during this event continues to be significantly lower in concentration compared to the previous events in December 2018 (65 mg/l), September 2018 (222 mg/l), November 2015 (458 mg/l), and the supplemental re-sampling in December 2015 (360 mg/l). Chloride concentrations at MW-3 have remained below the 250 mg/l 2DWS for chloride during this February 2020 event and each of the quarterly 2019 sample events (March 2019, June 2019, September 2019, and November 2019). In addition, the chloride concentration at MW-3 during this February 2020 event was lower than the twenty-two monitoring events from July 16, 2010 to December 4, 2018. Although the chloride concentrations reported at MW-5 have remained below the 2DWS for chloride concentrations, the chloride concentrations at MW-5 appeared to be increasing slightly from November 2016 to September 2019, based on the time-series graphs. However, a slight decrease in the chloride concentrations at MW-5 has been observed during the last two consecutive sampling events. The chloride concentrations at MW-3 and MW-5 will continue to be evaluated.

Fluoride was detected at MW-3 (0.161 mg/l) and the duplicate sample collected from MW-3 (0.153 mg/l) during this February 2020 monitoring event, which were well below the MCL (4.0 mg/l) for fluoride. Also, the observed fluoride concentrations at MW-3 and the duplicate sample collected at MW-3 were well below the 2DWS (2.0 mg/l) for fluoride.

Total Iron was detected above the 2DWS (0.3 mg/l) in up-gradient well MW-1 (12.3 mg/l) and down-gradient wells TMW-1 (1.07 mg/l), TMW-2 (0.639 mg/l), and TMW-3 (0.68 mg/l) during the February 2020 monitoring event. The reported total iron concentrations at each of the groundwater monitoring wells were less than the highest concentrations observed prior to placement of waste and do not exhibit a trend via time-series graphs. The presence of iron in the local groundwater is considered to be naturally occurring, originating from deposits in the soil overburden, and iron has consistently been detected above the 2DWS in up-gradient well MW-1.

Total Manganese detections were observed above the 2DWS (0.05 mg/l) in up-gradient MW-1 (1.21 mg/l) and down-gradient wells MW-3 (0.175 mg/l) and MW-5 (0.227 mg/l) during the February 2020 monitoring event. Total Manganese has been consistently detected at concentrations above the 2DWS (0.05 mg/l) in up-gradient well MW-1. The presence of total

manganese in the local groundwater is considered to be naturally occurring, originating from deposits in the soil overburden.

Total Nickel was detected in up-gradient well MW-1 (0.00803 mg/l) and down-gradient wells MW-3 (0.00326 mg/l), and MW-5 (0.00652 mg/l) during the February 2020 sampling event, and these values were not above the MCL value obtained from the Tennessee Division of Water Resources (TN DWR) Public Water Systems chapter rule 0400-45-01-.06 (0.10 mg/l). Total nickel has been detected at concentrations above the TN DWR Public Water Systems MCL (0.1 mg/l) in up-gradient well MW-1 during previous events on April 9, 2009 (total nickel at MW-1= 0.2 mg/l) and May 19, 2009 (total nickel at MW-1=0.17 mg/l). Therefore, the presence of total nickel in the local groundwater is considered to be naturally occurring, originating from deposits in the soil overburden. The observed total nickel concentration at MW-3 during this event was lower in concentration compared to the November 2019 event (0.00468 mg/l).

The **Sulfate** concentration reported at MW-3 (62.0 mg/l) during this February 2020 sampling event was below the 2DWS for sulfate (250 mg/l). Also, the sulfate concentrations at MW-3 have been consistently decreasing each event since September 2018. Sulfate concentrations in MW-3 since that time include: the previous November 2019 event (111 mg/l), the September 2019 event (154 mg/l), the June 2019 event (219 mg/l), the December 2018 event (324 mg/l), and the September 2018 event (484 mg/l). The September 2018 event was the first time the sulfate concentration at MW-3 was above the 2DWS. Prior to September 2018, the sulfate concentration at MW-3 had remained below the 2DWS during previous events in June 2018 (30.1 mg/l), December 2017 (46.2 mg/l), September 2017 (46.2 mg/l), and June 2017 (93.7 mg/) monitoring events. For further comparisons, the detected sulfate concentration at MW-3 was 34 mg/l in November 2016, 95.7 mg/l in August 2016, and 105 mg/l in March 2017. Prior to August 2016, the reported sulfate concentrations at MW-3 ranged from <5 mg/l to 29.1 mg/l.

Sulfate was also detected in MW-1 (5.72 mg/l) and MW-5 (9.5 mg/l) during this February 2020 event. Sulfate was not detected above the PQL of 5.00 mg/l in any of the other monitoring wells across the site.

Total Magnesium does not currently have an established MCL, 2DWS, EPA RSL, or an approved alternate groundwater protection standard (GWPS). The total magnesium concentration at MW-3 during this February 2020 sample event (6.73 mg/l) was lower than the previous November 2019 (10.3 mg/l), September 2019 (13 mg/l), June 2019 (20.8 mg/l), March 2019 (7.83 mg/l), December 2018 (36.4 mg/l), and September 2018 (64 mg/l) respective event concentrations. Before the September 2018 event, the highest total magnesium concentration observed at MW-3 was 31.9 mg/l during the November 2015 monitoring event, and total magnesium concentrations have remained below 31.9 mg/l at MW-3 in recent groundwater events from December 2018 to November 2019.

Magnesium was also detected above the laboratory PQL (1.00 mg/l) during the February 2020 sample event in MW-1 (3.52 mg/l), MW-4 (2.8 mg/l), MW-5 (12.4 mg/l), TMW-1 (3.05 mg/l), TMW-2 (4.46 mg/l), and TMW-3 (7.07 mg/l).

4.3 QUALITY CONTROL QUALIFIER CODES

The EPA Contract Laboratory Program states that sample and result qualifiers should be utilized as part of a total quality-control process. Pace complies with this directive and reports all qualifiers along with explanations of QC qualifier codes. Nine QC qualifier codes (B, E, J, J3, J4, J6, P1, O1, and V) were indicated during the laboratory analysis of samples collected in February 2020. Eight qualifier codes (B, E, J, J3, J4, J6, O1, and V) were indicated during the laboratory analysis of groundwater samples. Eight QC qualifier codes (B, E, J, J3, J4, J6, P1, and V) were indicated during the laboratory analysis of the APWC and IWC leachate samples. Specific information concerning each laboratory QC qualifier code can be found in the Laboratory Analytical Reports in Appendix C (Page 56 of 59 in the Groundwater Analytical Report, Page 31of 33 in the Leachate Analytical Report).

5.0 STATISTICAL ANALYSIS

5.1 APPLICABLE METHODS

The Rules of the Tennessee Department of Environment and Conservation, Division of Solid Waste Management Chapter 0400-11-01-.04(7) state, in part, that each landfill must conduct and report statistical analyses as part of the evaluation of groundwater monitoring data. Statistical analyses of the sampling data was performed on monitoring wells MW-1, MW-3, MW-4, MW-5, TMW-1, TMW-2, and TMW-3.

The solid waste rules require groundwater sample results and associated statistical methods used to determine the statistical background of a groundwater detection/assessment monitoring program be “protective of human health and the environment”. Furthermore, the rules require that the results be “representative” of the background groundwater quality of the geologic formation(s) being monitored. Various influences may affect the representativeness of sample results, which include possible errors in sampling. As previously discussed, reported total metals concentrations are likely affected by elevated turbidity values and would not be representative of the natural groundwater conditions. Before statistical evaluations were completed, the turbidity values which were collected during historical groundwater sampling events were evaluated for elevated turbidity values (>150 NTU). If the turbidity value at the time of sample collection at any given location was greater than 150 NTUs, the total metals concentrations for each sample location would not be representative of natural groundwater conditions. As a result, the corresponding data were removed from the background data set.

After the non-representative background sample data were removed, the distribution of the data was evaluated for normality. The test for normality was conducted using the Shapiro-Wilks method if N <50 or Shapiro-Francia method if N>50. The normality test was performed for both

raw and log-transformed data, with replacement of non-detects to half of the corresponding laboratory PQL. Data determined to be normally distributed were evaluated using parametric prediction limit (PPL) analysis. Inter-well and intra-well (intra-well utilized for upgradient MW-1) statistical methods were appropriately utilized to determine statistically significant increases in constituent concentrations.

Intra-well analyses was utilized only at MW-1 to compare the concentrations observed during the current groundwater-sampling event to the established background data set for MW-1 concentrations. Intra-well PPL and non-parametric statistical methods were appropriately utilized to determine statistically significant changes in background water quality data in up-gradient monitoring well MW-1. The arsenic data at MW-1 were normally distributed using the Shapiro-Wilks test for normality. The cobalt data at MW-1 were normally distributed using the Shapiro-Wilks test for normality when the data were log-transformed and non-detects were replaced by half of the corresponding PQL. Therefore, intra-well PPL analysis was performed for the data sets that passed normality testing. However, all other data sets (barium, chloride, nickel, sulfate, and mercury data) for MW-1 were not normally distributed and were evaluated using intra-well non-parametric statistical methods.

Inter-well analyses compared the concentrations observed at the down-gradient monitoring locations (MW-3, MW-4, MW-5, TMW-1, TMW-2, and TMW-3) to the concentrations observed at the up-gradient monitoring location (MW-1) during this monitoring event. Chloride data distribution tests from all up-gradient and down-gradient monitoring wells indicated normality when the data were log-transformed and non-detects were replaced by half of the corresponding PQL. Therefore, the chloride data at MW-3, MW-4, MW-5, TMW-1, TMW-2, and TMW-3 were evaluated using PPL inter-well analysis. All other data sets (aluminum, barium, total cadmium, chromium, cobalt, fluoride, nickel, zinc, and sulfate data) at all up-gradient and down-gradient monitoring wells were not normally distributed and were evaluated using non-parametric statistical methods.

The percentage of inter-well non-detects for each parameter determined the primary statistical method utilized. If the percentage of non-detects in the samples was less than 50%, Shewart-CUSUM control charts were utilized. If at least 50% non-detects existed for the given parameter, non-parametric inter-well prediction limit analysis was conducted on the data. For this site, the total % non-detects for aluminum (37.80% non-detects) and barium (0% non-detects) were less than 50%, and Shewart-CUSUM control charts were utilized for aluminum and barium analysis. Based on the high amount of left-censored data (>/=50% of non-detects) for total cadmium, chromium, cobalt, fluoride, nickel, zinc, and sulfate, non-parametric inter-well prediction limit analysis was conducted for the background data from up-gradient well MW-1 compared to down-gradient monitoring wells (MW-3, MW-4, MW-5, TMW-1, TMW-2, and TMW-3). Additional statistical procedures performed included Mann-Kendall trend analyses and the non-parametric Wilcoxon Rank Sum group comparisons (with non-detects set to the highest reporting limit for the given constituent analyzed). The Wilcoxon Rank Sum non-parametric inter-well analysis was

conducted as a confirmation test for any parameter that failed the above-mentioned statistical analysis methods for final determination of a statistical increase.

The computer program ChemStat v.6.4 was used for all statistical computations. Worksheets for inter-well and intra-well statistical analysis and time versus concentration charts are given in **Appendix B – Statistical Evaluations and Time Series Plots.**

5.2 STATISTICAL RESULTS

No statistically significant increases (SSIs) were identified in up-gradient well MW-1 during this event.

SSIs over background identified for the current monitoring event include chloride at MW-3, MW-4, MW-5, TMW-1, TMW-2, and TMW-3, total cadmium at MW-3, and sulfate at MW-3. It should be noted that no SSIs were identified for the fluoride concentrations at MW-3 during this event. Also, zinc was not detected above the PQL at MW-3 during this event. Trend analyses revealed a statistically significant upward trend in total cadmium, chloride, fluoride, and sulfate concentrations reported at MW-3. In addition, trend analyses revealed a statistically significant upward trend in total barium, chloride, chromium, and sulfate at MW-5. A statistically significant upward trend in total barium was also reported at TMW-3. A statistically significant upward trend in chloride concentrations was reported at TMW-1, TMW-2, and TMW-3. There were no distinct statistically significant trends in total aluminum at MW-5, TMW-1, and TMW-3; barium concentrations reported at MW-3, TMW-1, and TMW-2; chloride concentrations reported at MW-4; chromium concentrations reported at TMW-1 and TMW-2; cobalt concentrations at MW-5; and nickel concentrations reported at MW-5. In addition, trend analysis revealed a downward trend in total aluminum concentrations in MW-3 and TMW-2; barium concentrations at MW-4; and nickel concentrations at MW-3.

The total cadmium concentration observed at MW-3 indicated an SSI in reported concentrations using inter-well non-parametric prediction limits by using cadmium concentrations observed at the up-gradient monitoring location (MW-1) as background for comparison. However, the total cadmium concentration at MW-3 (0.00212 mg/l) was just above the laboratory PQL, but was less than the MCL (0.005 mg/l) for the second consecutive sampling event. The previous November 2019 event (total cadmium at MW-3=0.00157 mg/l) was the first time the total cadmium concentration had been below the MCL since November 10, 2016 (total cadmium at MW-3=0.00177 mg/l). No distinct statistically significant trend was identified by Mann-Kendall for total cadmium concentrations at MW-3 when considering data from the past 15 sampling events since November 10, 2016. The total cadmium concentrations reported at MW-3 during this sampling event on February 27, 2020 (0.00212 mg/l and 0.00200 mg/l in duplicate sample) were significantly lower in concentration than recent events since 2016. For instance, the total cadmium concentrations during this February 2020 event was significantly lower than the previous September 5, 2019 event (0.0088 mg/l and 0.00822 mg/l in duplicate sample), June 4, 2019 event (0.0292 mg/l and 0.0288 mg/l in duplicate sample) and March 5, 2019 event (0.0117 mg/l and 0.0113 mg/l in duplicate sample).

The chloride concentrations observed at MW-3 (17.8 mg/l), MW-4 (7.87 mg/l), MW-5 (80.4 mg/l), TMW-1 (19.7 mg/l), TMW-2 (31.9 mg/l), and TMW-3 (62.0 mg/l) produced SSIs over background during this event. The chloride detections at MW-3, MW-4, MW-5, TMW-1, TMW-2, and TMW-3 are consistent with previous data and are below the 2DWS for chloride concentrations (250 mg/l). When considering all chloride data to date from MW-4, the data do not show an upward or downward trend in chloride concentrations using the Mann-Kendall trend analysis at the 95% confidence level. However, the chloride concentrations observed at MW-3, MW-5, TMW-1, TMW-2, and TMW-3 indicated upward trends in chloride concentrations using the Mann-Kendall trend analyses at the 95% confidence level.

The chromium concentrations observed at MW-5 (0.00565 mg/l), TMW-1 (0.00246 mg/l), and TMW-3 (0.00234 mg/l) were less than the MCL (0.1 mg/l), and did not produce a SSI in reported concentrations during this event. When considering all chromium data to date from MW-5, TMW-1, and TMW-3 the data did not show an upward or downward trend in chromium concentrations using the Mann-Kendall trend analysis at the 95% confidence level. However, the same analyte (chromium) was found in the associated laboratory blank. Therefore, the chromium concentration reported during this event at MW-5, TMW-1, and TMW-3 may have been artificially elevated.

The cobalt concentration observed at MW-5 (0.00234 mg/l) was less than the GWPS value referenced from the EPA Regional Screening Levels for cobalt (0.006 mg/l), and did not produce a SSI in reported concentrations during this event.

The fluoride concentration at MW-3 (0.197 mg/l) was less than the MCL (4.0 mg/l) during this event, was similar to the previous November 2019 event (0.161 mg/l), and was significantly lower than the September 2019 event (0.306 mg/l). When considering all data accumulated from MW-3 since January 21, 2009, a statistically significant upward trend in fluoride concentrations at MW-3 was indicated using the Mann-Kendall trend analysis at the 95% confidence level. The highest fluoride detection at MW-3 was in September 2018 (0.543 mg/l), and was less than the MCL.

A SSI in reported sulfate concentrations at MW-3 was identified during this sampling event. In addition, when considering all data accumulated from MW-3 since May 19, 2009, a statistically significant upward trend in sulfate concentrations at MW-3 was indicated using the Mann-Kendall trend analysis at the 95% confidence level. The sulfate concentration reported during this sampling event (62.0 mg/l) was lower than the previous November 2019 event (111 mg/l), September 2019 event (154 mg/l), June 2019 event (219 mg/l), and March 2019 event (85.8 mg/l). Regardless, the concentration remains below the 2DWS of 250 mg/l. Also, the observed sulfate concentration during this event is significantly lower than the previous December 2018 event (324 mg/l) and the previous September 2018 event (484 mg/l). The sulfate concentrations observed at MW-3 had remained below the 2DWS during all previous monitoring events prior to September 2018. Sulfate was also detected in MW-5 (9.50 mg/l) during this February 2020 event, which was well below the 2DWS of 250 mg/l. Sulfate was not detected above the PQL in any of the other monitoring wells across the site. While there was an upward trend in sulfate concentrations identified in MW-5 during this event, there was no reported SSI.

A summary of intra-well and inter-well statistical analysis is presented in **Table 3 – Intra-Well and Inter-Well Statistical Summary in Appendix A.**

6.0 CONCLUSIONS

The results of the first quarter assessment-monitoring event of 2020 are summarized as follows:

- SSIs over background identified for the current monitoring event include chloride at MW-3, MW-4, MW-5, TMW-1, TMW-2, and TMW-3, total cadmium at MW-3, and sulfate at MW-3.
- Trend analyses revealed statistically significant upward trends in total cadmium, chloride, fluoride, and sulfate concentrations reported at MW-3. In addition, trend analyses revealed a statistically significant upward trend in total barium, chloride, chromium, and sulfate at MW-5; a statistically significant upward trend in total barium was also reported at TMW-3; and a statistically significant upward trend in chloride concentrations was reported at TMW-1, TMW-2, and TMW-3. However, trend analysis revealed a statistically significant downward trend in aluminum and nickel concentrations reported at MW-3; a statistically significant downward trend in aluminum concentrations at TMW-2; and a statistically significant downward trend in barium concentrations at MW-4.
- The total cadmium levels at MW-3 have improved significantly since closure activities have been completed. The total cadmium detections at MW-3 have been below the MCL during the two most recent monitoring events since closure activities have been completed, and the total cadmium concentration reported at MW-3 during this event was lower than the 12 consecutive sampling events from June 8, 2017 to September 5, 2019. In addition, there have been no cadmium detections from groundwater samples obtained from temporary monitoring wells TMW-2 and TMW-3 that are immediately down-gradient of MW-3.
- The arsenic concentration at up-gradient MW-1 has previously exceeded the MCL. However, arsenic was not detected above the MCL at MW-1 during this event, and did not indicate a SSI. Arsenic was not detected above the laboratory PQL in any of the down-gradient monitoring locations (MW-3, MW-4, MW-5, TMW-1, TMW-2, and TMW-3) during the 1st Quarter 2020 event.
- A SSI was identified for the reported sulfate concentration at MW-3, and the sulfate concentrations at MW-3 exhibited a statistically significant increasing trend. During the September 2018 and December 2018 events, the observed sulfate concentrations at MW-3 had been above the 2DWS for sulfate (250 mg/l). However, the sulfate concentrations reported at MW-3 during recent events in 2019 and 2020 have been below the 2DWS for sulfate and appear to be decreasing in concentration.
- Based on the review of the time-series graphs, it appears that the concentrations of total aluminum, cadmium, calcium, fluoride, magnesium, manganese, nickel, potassium, zinc, chloride, zinc, and sulfate at MW-3 have decreased in concentration during recent quarterly events.

- The chloride concentrations at MW-1, MW-3, MW-4, MW-5, TMW-1, TMW-2, and TMW-3 are still well below the 250 mg/l 2DWS.
- Previous SSIs in reported total zinc concentrations at MW-3 were identified during monitoring events from September 2018 event to September 2019. However, total zinc was not detected above the PQL (0.0250 mg/l) at MW-3 during this monitoring event which was the first time zinc was below the PQL at MW-3 since November 10, 2016. Before June 2017, zinc had remained below the current laboratory PQL of 0.025 mg/l since July of 2010.
- No VOCs were detected above their respective laboratory PQL in any of the groundwater monitoring wells during the monitoring event.

The second quarter 2020 assessment-monitoring event is tentatively scheduled for May 2020 and will consist of collecting groundwater samples from up-gradient well MW-1 and down-gradient wells MW-3, MW-4, MW-5, TMW-1, TMW-2, and TMW-3. Leachate samples will be collected from the APWC and IWC.

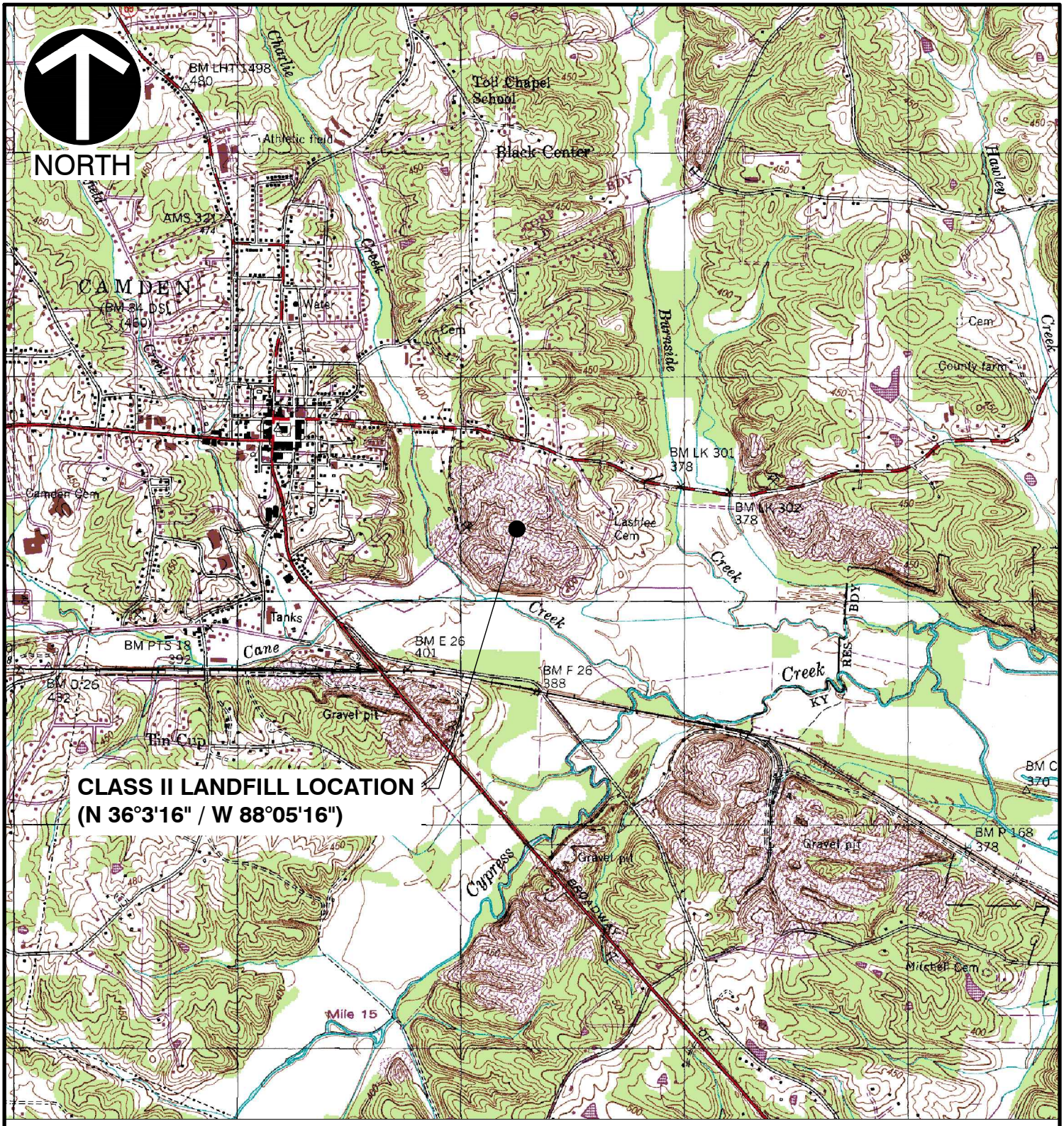
Since the former EWS Class II Landfill site remains in assessment monitoring, a private water use survey update is required annually. The previous annual water use survey for the former EWS Class II Landfill site was completed in November 2019, and no new wells or springs were identified within the approved search radius for the site during the November 2019 update. Therefore, an updated water use survey will be completed in November 2020, and will be documented and submitted in a separate report.

7.0 RECOMMENDATIONS

The following recommendations are presented in an effort to ensure the continuance of securing representative groundwater samples and to obtain analytical results with a high-degree of accuracy and precision (i.e., repeatability).

1. It is recommended that all permanent monitoring wells on the site continue to be monitored quarterly. In addition, quarterly groundwater samples will continue to be collected from temporary monitoring wells down-gradient from MW-3.
2. It is recommended that the chosen analytical laboratory (Pace) continue to analyze for total metal constituents using methods that will produce the lowest reporting limit. Additional sampling analysis for dissolved metals will not be necessary, considering recent analytical data has shown that total and dissolved metals concentrations have been similar when samples have low turbidities, and sampling for dissolved metals analysis (in addition to total metals) is not standard protocol when sample turbidities are low. If certain groundwater samples have turbidities that are elevated (observed primarily in temporary monitoring wells TMW-1, TMW-2, and TMW-3), samples may be collected for dissolved metals analysis (in addition to total metals analysis).
3. It is recommended that total metals sample data will continue to be removed from the background data set for statistical evaluations if elevated turbidity values are observed during sample collection.

APPENDIX A
MAPS & TABLES



REFERENCE

1. U.S.G.S. 7.5' TOPOGRAPHIC MAP, CAMDEN QUADRANGLE, TENN. DATED: 1950, PHOTOREVISED: 1984.

SCALE IN FEET

0 2000' 4000'

* HAND SIGNATURE ON FILE

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FORMER EWS SITE
CLASS II CAMDEN LANDFILL
CAMDEN, TENNESSEE

SITE LOCATION MAP

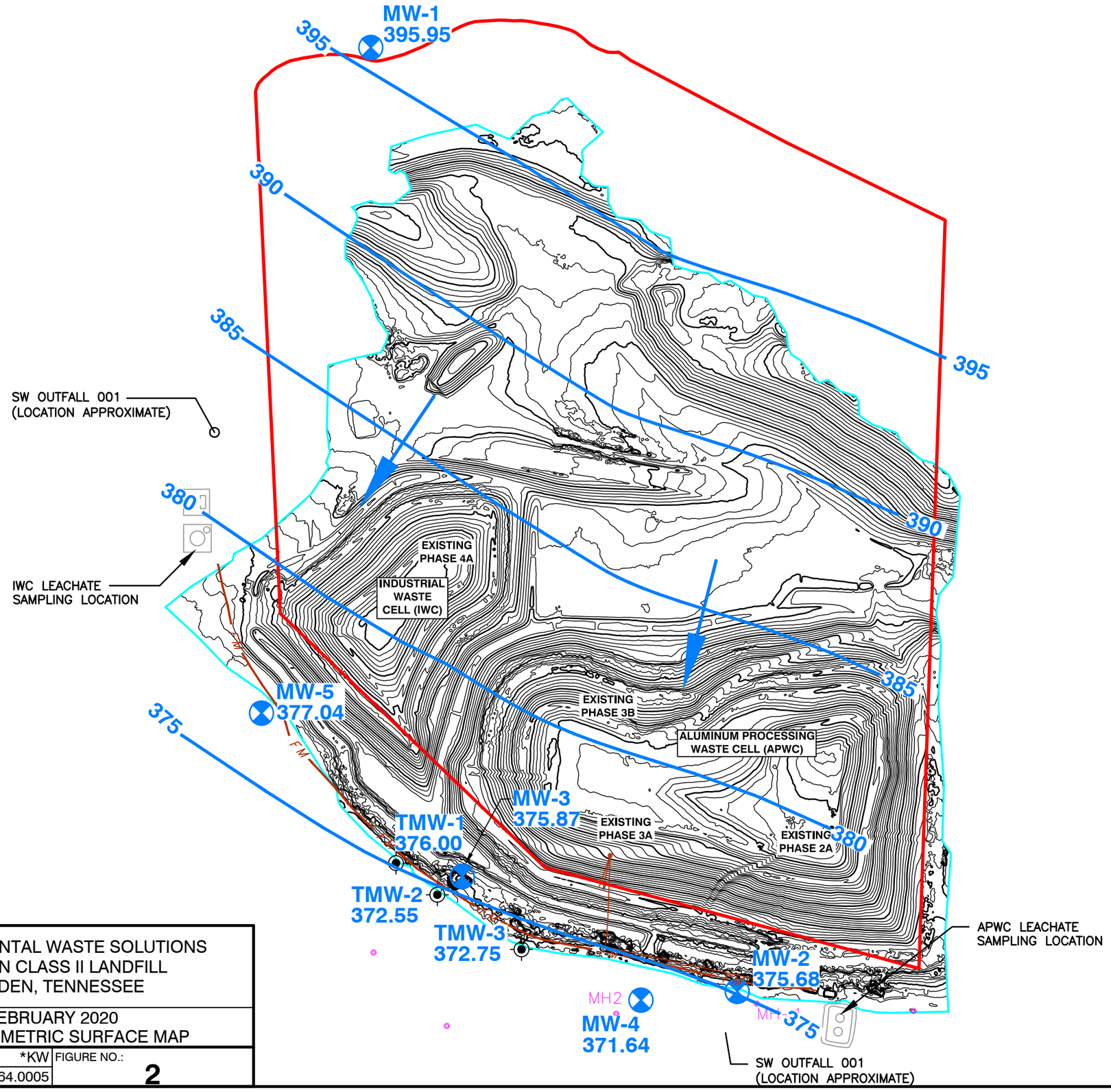
DRAWN BY:	AAB	CHECKED BY:	PC	APPROVED BY:	KBW*	FIGURE NO.:	1
DATE:	APRIL 2020	DWG SCALE:	1"=2000'	PROJECT NO:	181-364		

P:\2018\181-364\-CADD\Dwg\181-364_ SITE LOCATION MAP.dwg{LAYOUT1} LS:(4/7/2020 - dbaugh) - LP: 4/7/2020 11:41 AM

NORTH

LEGEND

MW1 395.95	GROUND WATER MONITORING WELL GROUND WATER ELEVATION (FMSL)
TMW-1 376.00	TEMPORARY GROUND WATER MONITORING WELL GROUND WATER ELEVATION (FMSL)
390	POTENTIOMETRIC SURFACE CONTOUR (FMSL)
	GROUND WATER FLOW DIRECTION
MH1	MANHOLE
	APPROXIMATE FILL LIMITS
FM	LEACHATE FORCE MAIN



NOTE:

Hydraulic gradient calculation between MW–1 and MW–4 locations.

$$i = \frac{395.95' \text{ (MW–1)} - 371.64' \text{ (MW–4)}}{1{,}910'} = 0.0127 \text{ ft/ft}$$

GROUNDWATER CONDITIONS

THE WATER LEVELS PRESENTED HEREIN ARE APPLICABLE TO THE LOCATION AND TIME OF MEASUREMENT. WATER LEVELS MAY FLUCTUATE THROUGH TIME.

POTENTIOMETRIC CONTOURS GENERATED FROM THESE DATA ARE CONSTRUCTED BY INTERPOLATION BETWEEN POINTS OF KNOWN STATIC WATER LEVEL ELEVATIONS AND USING KNOWLEDGE OF SPECIFIC SITE CONDITIONS. ACTUAL STATIC WATER LEVELS AT LOCATIONS BETWEEN THE MONITORING POINTS MAY DIFFER FROM THOSE DEPICTED.

SCALE IN FEET

0 200 400

*HAND SIGNATURE ON FILE

Civil & Environmental Consultants, Inc.
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www.cecinc.com

ENVIRONMENTAL WASTE SOLUTIONS
CAMDEN CLASS II LANDFILL
CAMDEN, TENNESSEE

FEBRUARY 2020
POTENTIOMETRIC SURFACE MAP

DRAWN BY:	AAB	CHECKED BY:	PC	APPROVED BY:	*KW	FIGURE NO.:	2
DATE:	APRIL 2020	DWG SCALE:	1"=200'	PROJECT NO:	181-364.0005		

P:\2018\181-364\-CADD\DWG\181-364_ GROUNDWATER MAP FEBRUARY 2020.DWG{FIG 2 (2)}LS:(PCAMPBELL – 4/15/2020) – LP: 4/15/2020_4:55:22_PM

Table 1

Former Environmental Waste Solutions Camden Class II Landfill

Field Parameters and Potentiometric Data - February 2020

Monitoring Well/ Sample Location	Date	Sample Time	Top of Casing Elevation[1] (Feet MSL)	Bottom of Well Elevation (Feet)	Well Diameter (Feet)	Well Volume Gallons	Depth to Water (Feet)[2]	Potentiometric Surface (Feet MSL)	Temp. (˚C)	Conductivity (µS/cm)	Specific Conductivity (µS/cm)	pH (SU)	Dissolved Oxygen (mg/l)	Oxidation Reduction Potential (mV)	Turbidity (NTU)
MW-1	2/27/2020	11:05	416.47	385.97	0.17	1.7	20.52	395.95	14.5	96.6	121.1	5.39	1.28	43.4	6.74
MW-2*	2/27/2020	12:35	380.35	367.70	0.17	1.4	4.67	375.68	10.1	336.2	470.1	5.88	2.88	164.4	1.01
MW-3	2/27/2020	13:50	392.90	365.10	0.17	1.8	17.03	375.87	12.3	213.8	282.1	5.11	0.84	173.8	7.63
MW-4	2/27/2020	13:10	381.47	358.37	0.17	2.3	9.83	371.64	14.2	61.5	77.6	5.55	2.60	149.7	1.26
MW-5	2/27/2020	12:05	385.25	351.40	0.17	4.4	8.21	377.04	15.7	319.2	388.1	5.07	1.06	142.5	9.19
TMW-1	2/27/2020	12:40	381.19	348.99	0.085	1.1	5.19	376.00	13.6	103.1	129.5	5.49	3.47	33.1	49.2
TMW-2	2/27/2020	14:30	384.27	356.77	0.085	0.7	11.72	372.55	13.2	128.1	162.3	5.45	4.70	38.7	25.2
TMW-3	2/27/2020	15:45	381.37	353.37	0.085	0.8	8.62	372.75	14.3	253.8	318.4	5.19	1.00	10.1	16.7
**Leachate (IWC-L)	3/3/2020	14:23	NA	NA	NA	NA	NA	NA	19.9	27,937	30,949	4.73	7.08	190.3	NS
Leachate (APWC-L)	3/3/2020	13:08	NA	NA	NA	NA	NA	NA	44.5	94,010	68,794	9.04	1.37	67.1	NS

[1] Top of Casing Elevations from survey by Civil & Environmental Consultants, Inc. on May 12, 2016.

[2] Depth to water measurements collected by Civil & Environmental Consultants, Inc. on February 27, 2020.

*MW-2 has been removed from monitoring network. Only water level and field parameters collected at MW-2.

**Leachate (IWC-L) was collected from the lift station access

NS= Not Sampled

NA= Not Applicable.

Table 2
Former EWS Camden Class II Landfill IDL 03-0212 (Terminated)
Groundwater and Leachate Analytical Data - February 2020

		MW-1	Qualifier	MW-3	Qualifier	Duplicate (MW-3)	Qualifier	MW-4	Qualifier	MW-5	Qualifier	TMW-1	Qualifier	TMW-2	Qualifier	TMW-3	Qualifier	Field Blank	Qualifier	IWC-Leachate	Qualifier	APWC-Leachate	Qualifier
		2/27/2019		2/27/2019		2/27/2019		2/27/2019		2/27/2019		2/27/2019		2/27/2019		2/27/2019		2/27/2019		03/03/2020		03/03/2020	
Parameter	**MCL/GWPS (mg/l)**	**Value (mg/l)**		**Value (mg/l)**		**Value (mg/l)**		**Value (mg/l)**		**Value (mg/l)**		**Value (mg/l)**		**Value (mg/l)**		**Value (mg/l)**		**Value (mg/l)**		**Value (mg/l)**		**Value (mg/l)**	
Hardness	-	**31.1**	B	**74.9**		**76.4**		<30.0		**102**		**39.0**	B	**46.0**	B	**84.7**		<30.0		**5300**		**36.1**	B
Alkalinity	-	**57.7**		<20.0		<20.0		**20.6**	B	<20.0		<20.0		<20.0		<20.0		<20.0		**36.9**	B	**5080**	
Ammonia Nitrogen	-	**0.14**		<0.100		<0.100		<0.100		<0.100		<0.100		<0.100		<0.100		<0.100		**179**		**1710**	
COD	-	<10.0		<10.0		<10.0		<10.0		<10.0		<10.0		<10.0		<10.0		**13.8**		**637**		**2580**	
Boron	-	<0.200		<0.200		<0.200		<0.200		<0.200		<0.200		<0.200		<0.200		<0.200		<0.200		**4.57**	
Bromide	-	<1.00		<1.00		<1.00		<1.00		<1.00		<1.00		<1.00		<1.00		<1.00		<100		<20.0	
Chloride	250 [2]	**1.95**		**17.8**		**18.2**		**7.87**		**80.4**		**19.7**		**31.9**		**62.0**		<1.00		**10300**		**22300**	
Fluoride	2 [2]	<0.100		**0.161**		**0.153**		<0.100		<0.100		<0.100		<0.100		<0.100		<0.100		<0.100		**14.6**	
Nitrate	10 [1]	**0.182**		**1.04**		**1.06**		**0.611**		**1.39**		**1.71**		**0.898**		**5.18**		<0.100		**0.119**		**129**	
Sulfate	250 [2]	**5.72**		**62.0**		**62.2**		<5.00		**9.50**		<5.00		<5.00		<5.00		<5.00		<500		**278**	
Aluminum	0.2 [2]	<0.100		**0.238**		**0.230**		<0.100		**0.214**		**0.382**		**0.439**		**0.602**		<0.100		**30.3**		**3.88**	
Antimony	0.006	<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.0100		**0.022**	
Arsenic	0.01	**0.00807**		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		**0.0268**		**0.0564**	
Barium	2	**0.0243**	O1	**0.046**		**0.0451**		**0.00747**		**0.0547**		**0.0142**		**0.0323**		**0.0453**		<0.00500		**0.384**		**0.178**	
Beryllium	0.004	<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.0100		<0.00200	
Cadmium	0.005	<0.00100		**0.00214**		**0.00231**		<0.00100		<0.00100		<0.00100		<0.00100		<0.00100		<0.00100		**6.58**		**0.00538**	
Calcium	-	**6.06**		**18.8**		**18.6**		**4.70**		**18.0**		**10.5**		**12.1**		**21.3**		<1.00		**1760**		**4.01**	
Chromium	0.1	<0.00200		<0.00200		<0.00200		<0.00200		**0.00565**	B	**0.00246**	B	<0.00200		**0.00234**	B	<0.00200		**1.49**		**0.0755**	
Cobalt	0.006 [3]	**0.0744**		<0.00200		<0.00200		<0.00200		**0.00234**		<0.00200		<0.00200		<0.00200		<0.00200		**0.119**		**0.0116**	
Copper	1.3	<0.00500		<0.00500		<0.00500		<0.00500		<0.00500		<0.00500		<0.00500		<0.00500		<0.00500		**1.73**		**7.71**	
Iron	0.3 [2]	**12.3**		**0.101**		**0.100**		**0.126**		**0.249**		**1.07**		**0.639**		**0.680**		<0.100		**68.7**		**2.96**	
Lead	0.015	<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		**0.0802**		<0.0200	
Magnesium	-	**3.52**		**6.73**		**6.82**		**2.8**		**12.4**		**3.05**		**4.46**		**7.07**		<1.00		**185**		<1.00	
Manganese	0.05 [2]	**1.21**	V	**0.175**		**0.189**		**0.0141**		**0.227**		**0.0254**		**0.00937**		**0.0145**		<0.00500		**17.4**		**0.0602**	
Nickel	0.10 [1]	**0.00803**		**0.00326**		**0.00327**		<0.00200		**0.00652**		<0.00200		<0.00200		<0.00200		<0.00200		**0.996**		**0.114**	
Potassium	-	**1.28**		**3.74**		**3.68**		<1.00		**1.53**		**1.01**	B	**1.12**	B	**1.92**		<1.00		**1510**		**5630**	
Selenium	0.05	<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		**0.0215**		**0.0441**	
Silver	0.10 [2]	<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.0100		<0.0200	
Sodium	-	**3.27**		**10.3**		**10.6**		**3.3**		**20.6**		**3.53**		**4.63**		**12.6**		<1.00		**2480**		**8270**	
Thallium	0.002	<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.00200		<0.0100		<0.0200	
Vanadium	-	<0.00500		<0.00500		<0.00500		<0.00500		<0.00500		<0.00500		<0.00500		<0.00500		<0.00500		<0.0500		**0.0654**	
Zinc	5 [2]	<0.0250		<0.0250		<0.0250		<0.0250		<0.0250		<0.0250		<0.0250		<0.0250		<0.0250		**73.7**		**0.757**	
Mercury	0.002	**0.000797**		<0.000200		<0.000200		<0.000200		<0.000200		<0.000200		<0.000200		<0.000200		<0.000200		<0.000200		<0.000200	
Acetone	-	<0.0500	J3,J4	<0.0500	J3,J4	<0.0500		<0.0500	J3,J4	<0.0500		<0.0500		<0.0500		<0.0500		<0.0500	J3,J4	**0.97**	B,J4	**0.223**	B,J4
Carbon Disulfide	-	<0.00100		<0.00100		<0.00100		<0.00100		<0.00100		<0.00100		<0.00100		<0.00100		<0.00100		**3.48**		<0.00100	
2-Butanone (MEK)	-	<0.0100		<0.0100		<0.0100		<0.0100		<0.0100		<0.0100		<0.0100		<0.0100		<0.0100		**0.171**		**0.0121**	

Notes:
MCL: Maximum Contaminant Level Enforceable National Primary Drinking Water Standards
GWPS: Groundwater Protection Standard
[1] - MCL value obtained from TN Division of Water Supply rule 1200-5-.06(1)(b)11
[2] - MCL value obtained from TN Division of Water Supply rule 1200-5-1-.12(1)(n). (EPA Secondary Drinking Water Standard
[3] - GWPS value is referenced from EPA Regional Screening Level for Cobalt
NS- Not Sampled for analysis.
NA-Not Analyzed by the Laboratory
Bold text indicates laboratory analytical detections above the practical quantitation level
Dark gray shaded text indicates detection above respective MCL/GWPS
Light gray shaded text indicates detection above respective Non-Enforceable National Secondary Drinking Water Standard
B The same analyte is found in the associated blank.
O1 The analyte failed the method required serial dilution test and/or subsequent post-spike criteria. These failures indicate matrix interference
J3 The associated batch QC was outside the established quality control range for precision.
J4 The associated batch QC was outside the established quality control range for accuracy.
V The sample concentration is too high to evaluate accurate spike recoveries.

Table 3
Intra-Well and Inter-Well Statistical Summary
Environmental Waste Solutions Camden Class II Landfill IDL 03-0212 (Terminated)
Inorganic Analytical Data - February 2020

Intra-Well Statistical Summary (Upgradient Background Well MW-1)								
Constituent	Well	% Non Detects	Normality	Intra-well NPPL	Intra-well PPL	Shewhart-Cusum	Wilcoxon Rank Sum	SSI
Arsenic	MW-1	0.00	parametric	--	Pass	--	--	No
Barium	MW-1	0.00	non-parametric	Pass	--	Pass	--	No
Chloride	MW-1	0.00	non-parametric	Pass	--	Pass	--	No
Cobalt	MW-1	0.00	log-normal	--	Pass	--	--	No
Nickel	MW-1	39.29	non-parametric	Pass	--	Pass	--	No
Sulfate	MW-1	55.56	non-parametric	Pass	--	Pass	--	No
Mercury	MW-1	32.14	non-parametric	Pass	--	Pass	--	No

Inter-Well Statistical Summary (Downgradient Compliance Wells)									
Constituent	Well	Total % Non Detects	Normality	Inter-well NPPL	Inter-well PPL	Shewhart-Cusum	Wilcoxon Rank Sum	SSI	Mann-Kendall Trend Analysis
Aluminum	MW-3	37.80	non-parametric	--	--	Pass	--	No	**Downward Trend**
	MW-5		non-parametric	--	--	Pass	--	No	No Trend
	TMW-1		non-parametric	--	--	Pass	--	No	No Trend
	TMW-2		non-parametric	--	--	Pass	--	No	**Downward Trend**
	TMW-3		non-parametric	--	--	Pass	--	No	No Trend
Barium	MW-3	0.00	non-parametric	--	--	Pass	--	No	No Trend
	MW-4		non-parametric	--	--	Pass	--	No	**Downward Trend**
	MW-5		non-parametric	--	--	Pass	--	No	**Upward Trend**
	TMW-1		non-parametric	--	--	Pass	--	No	No Trend
	TMW-2		non-parametric	--	--	Pass	--	No	No Trend
	TMW-3		non-parametric	--	--	Pass	--	No	**Upward Trend**
Total Cadmium	MW-3	88.28	non-parametric	**Fail**	--	--	**Fail**	**Yes**	**Upward Trend**[1]
Chloride	MW-3	0.00	log-normal	--	**Fail**	--	--	**Yes**	**Upward Trend**
	MW-4		log-normal	--	**Fail**	--	--	**Yes**	No Trend
	MW-5		log-normal	--	**Fail**	--	--	**Yes**	**Upward Trend**
	TMW-1		log-normal	--	**Fail**	--	--	**Yes**	**Upward Trend**
	TMW-2		log-normal	--	**Fail**	--	--	**Yes**	**Upward Trend**
	TMW-3		log-normal	--	**Fail**	--	--	**Yes**	**Upward Trend**
Chromium*	MW-5	73.23	non-parametric	Pass	--	--	--	No	**Upward Trend**
	TMW-1		non-parametric	Pass	--	--	--	No	No Trend
	TMW-3		non-parametric	Pass	--	--	--	No	No Trend
Cobalt	MW-5	59.06	non-parametric	Pass	--	--	--	No	No Trend
Fluoride	MW-3	85.71	non-parametric	Pass	--	--	--	No	**Upward Trend**
Nickel	MW-3	60.47	non-parametric	Pass	--	--	--	No	**Downward Trend**
	MW-5		non-parametric	Pass	--	--	--	No	No Trend
Sulfate	MW-3	63.57	non-parametric	**Fail**	--	--	**Fail**	**Yes**	**Upward Trend**
	MW-5		non-parametric	Pass	--	--	--	No	**Upward Trend**

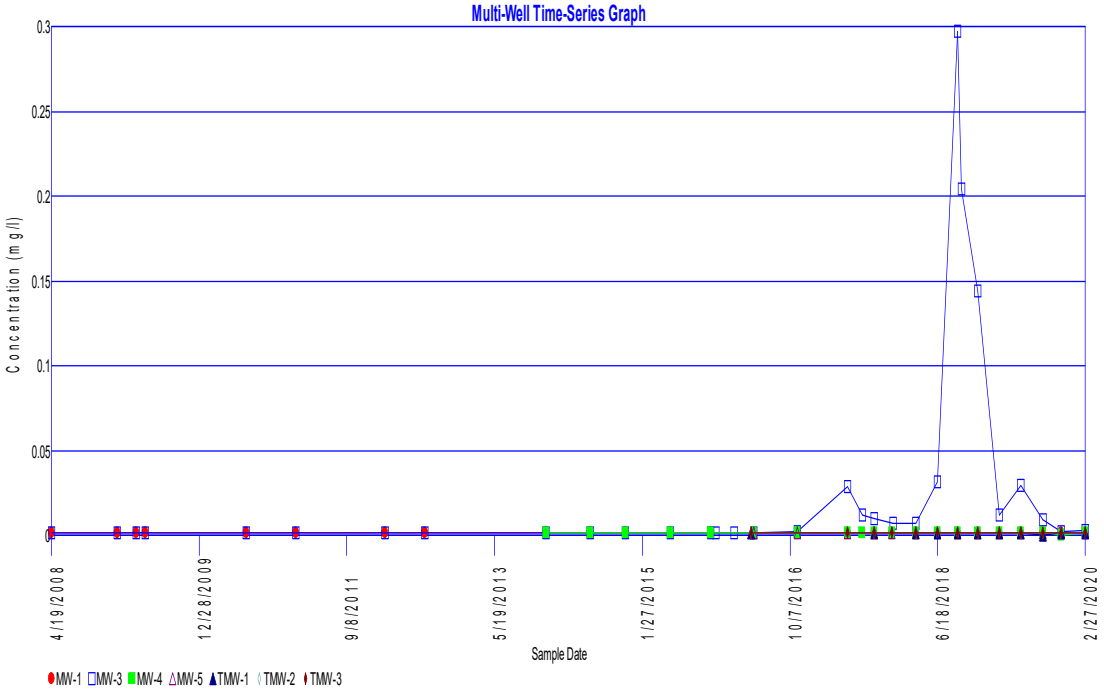
*-The same analyte is found in the associated blank. Therefore, the constituent concentration reported may be elevated.

[1] **No trend in data was observed using the 15 most recent sampling events since cadmium was first detected in November 2016.**

APPENDIX B
STATISTICAL EVALUATIONS & TIME SERIES PLOTS

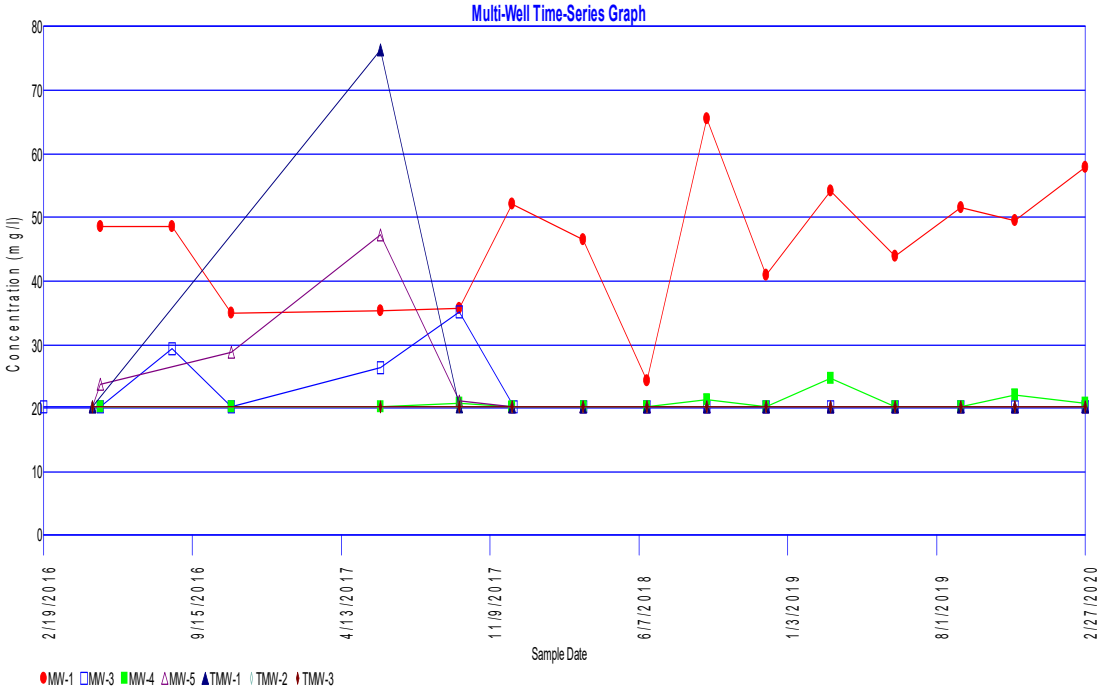
Total Cadmium

Multi-Well Time-Series Graph



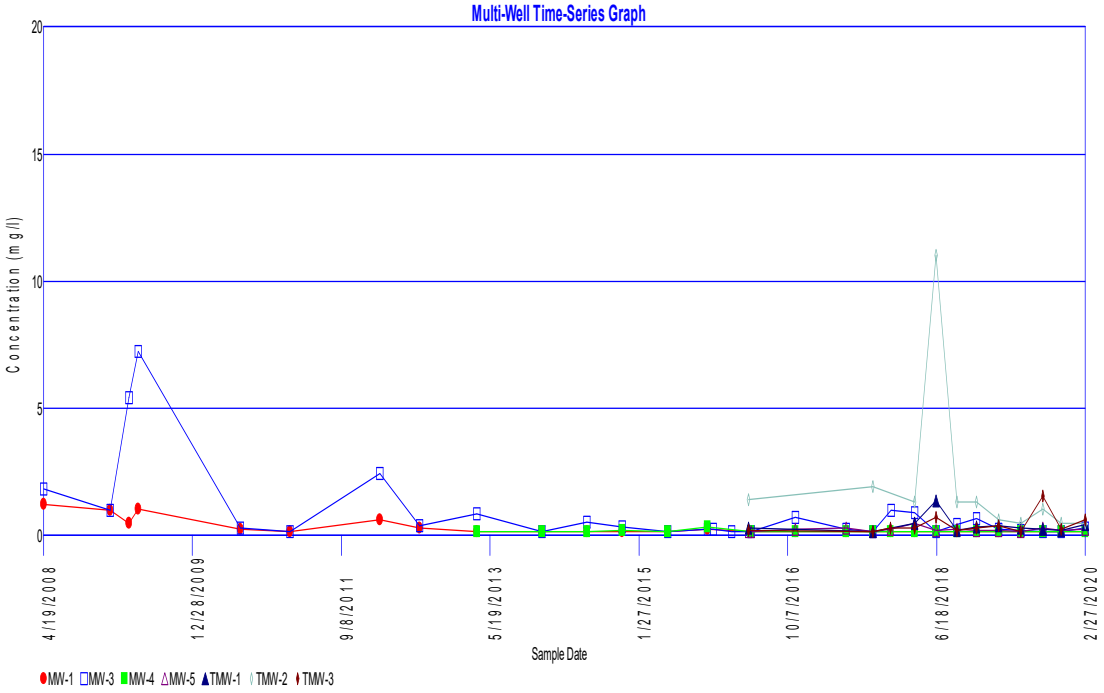
Alkalinity

Multi-Well Time-Series Graph



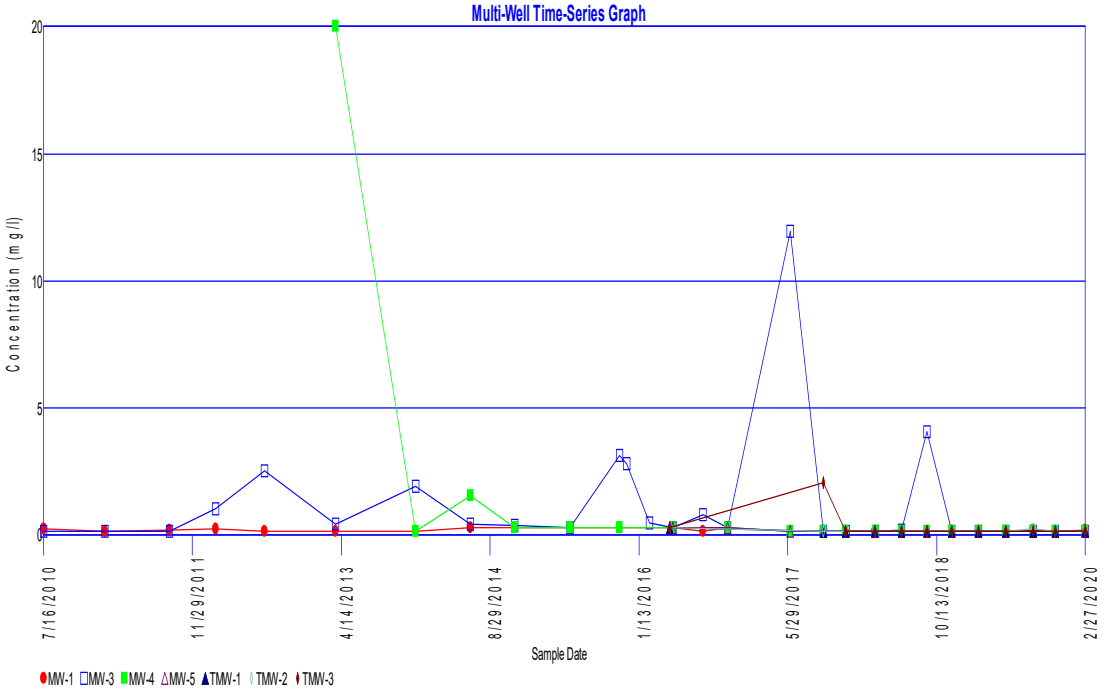
Aluminum

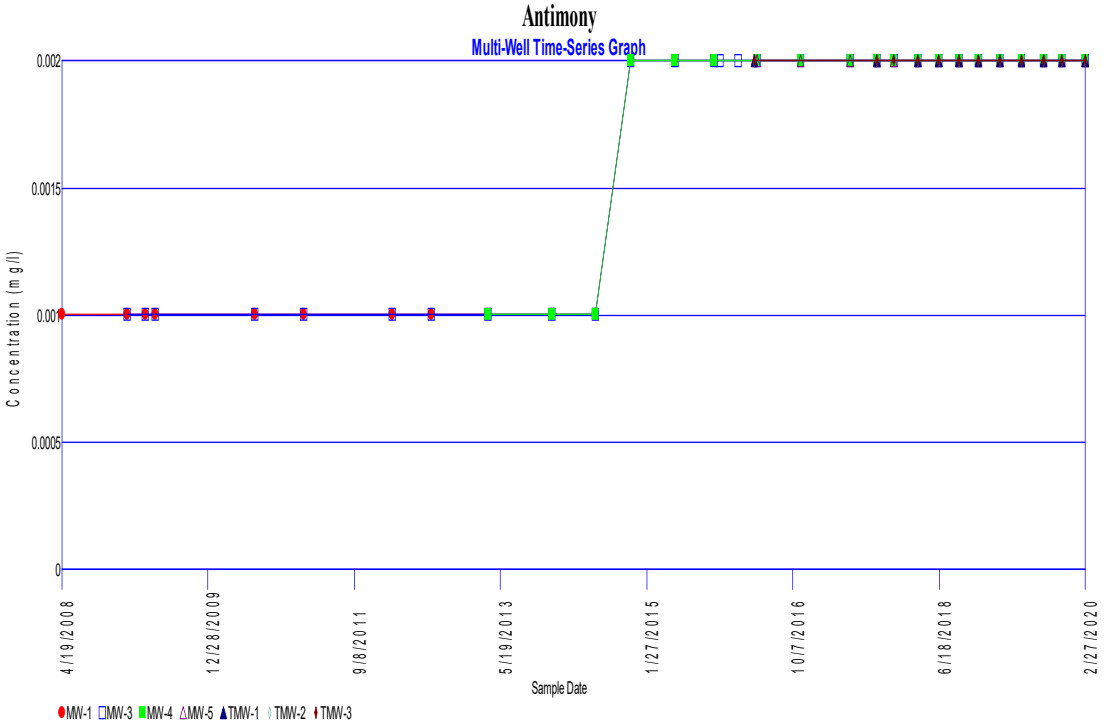
Multi-Well Time-Series Graph

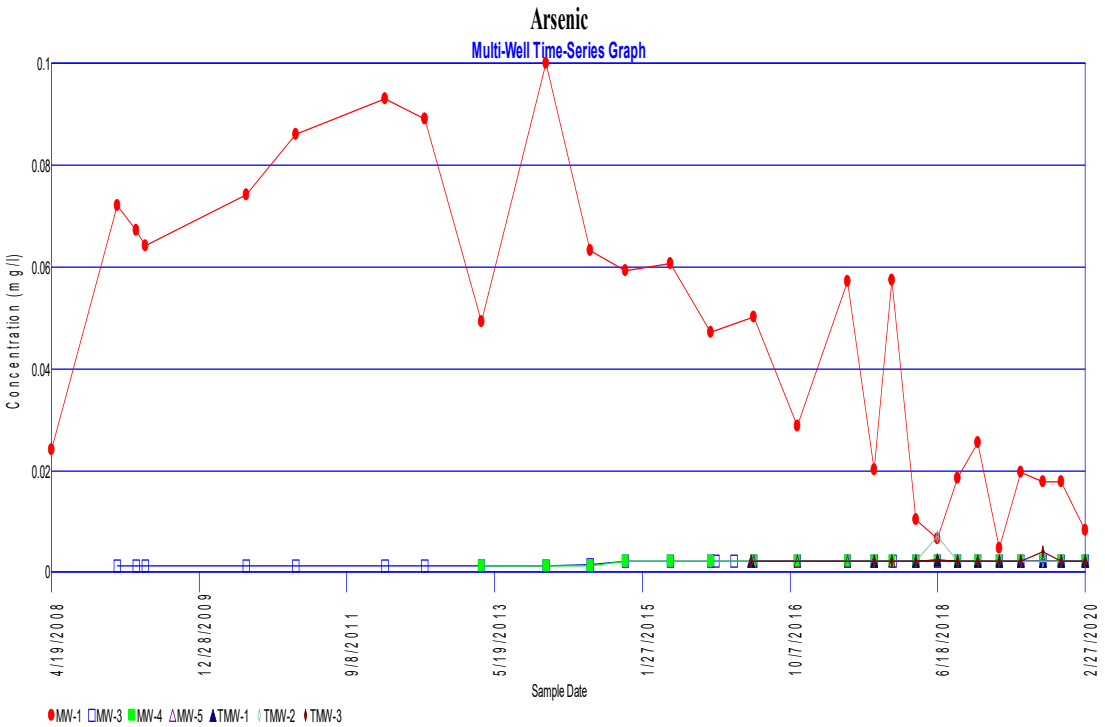


Ammonia Nitrogen

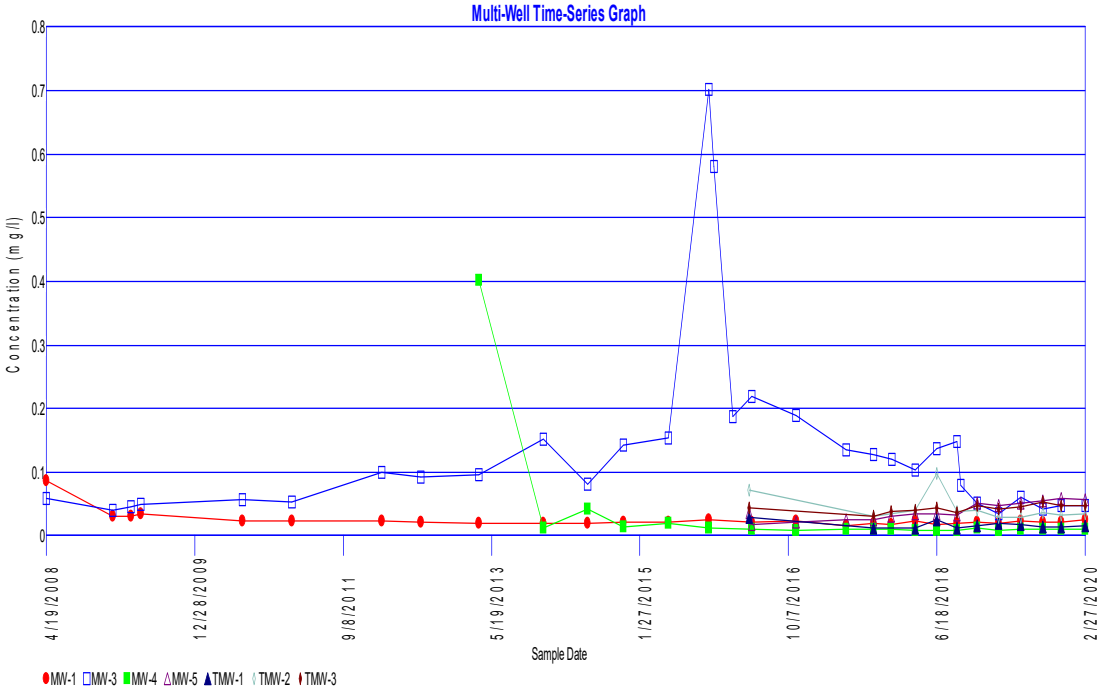
Multi-Well Time-Series Graph



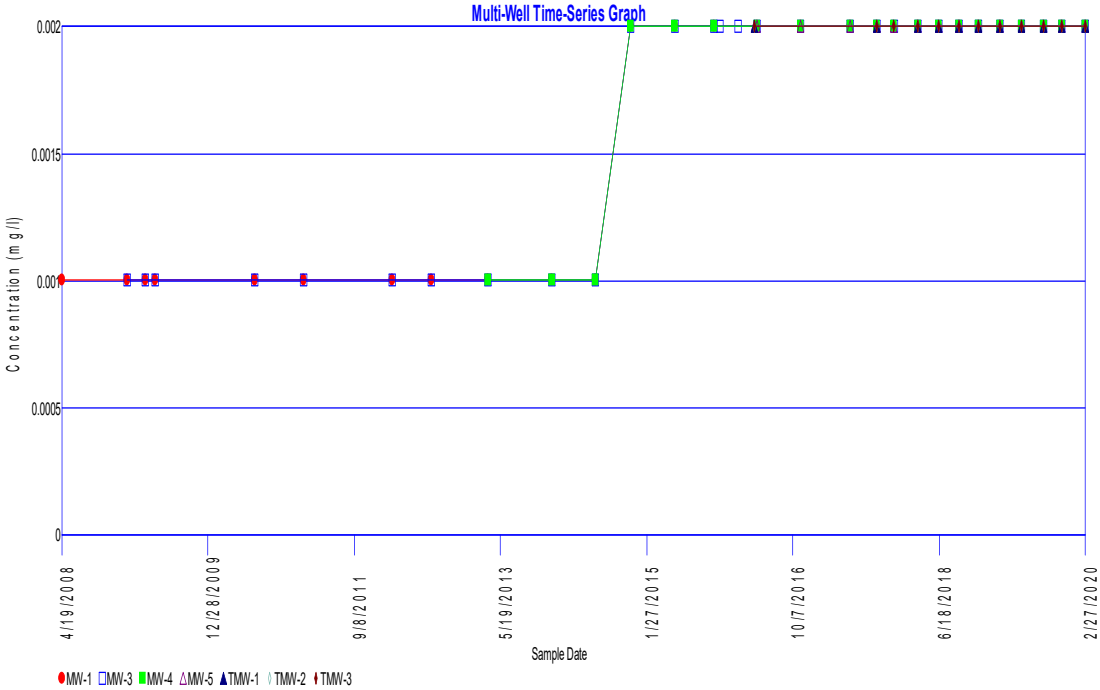

Antimony
Multi-Well Time-Series Graph
0.002
0.0015
0.001
0.0005
0
Concentration (mg/l)
4/19/2008
12/28/2009
9/8/2011
5/19/2013
1/27/2015
10/7/2016
6/18/2018
2/27/2020
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

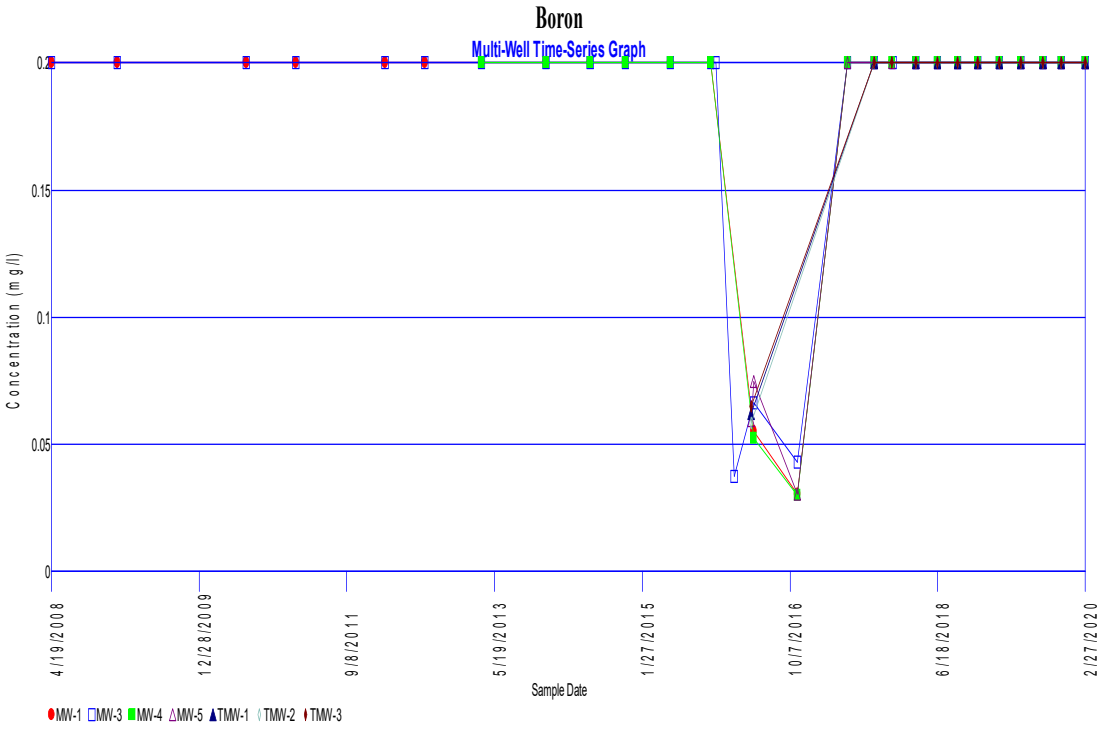

Arsenic
Multi-Well Time-Series Graph
0.1
0.08
0.06
0.04
0.02
0
Concentration (mg/l)
4/19/2008
12/28/2009
9/8/2011
5/19/2013
1/27/2015
10/7/2016
6/18/2018
2/27/2020
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

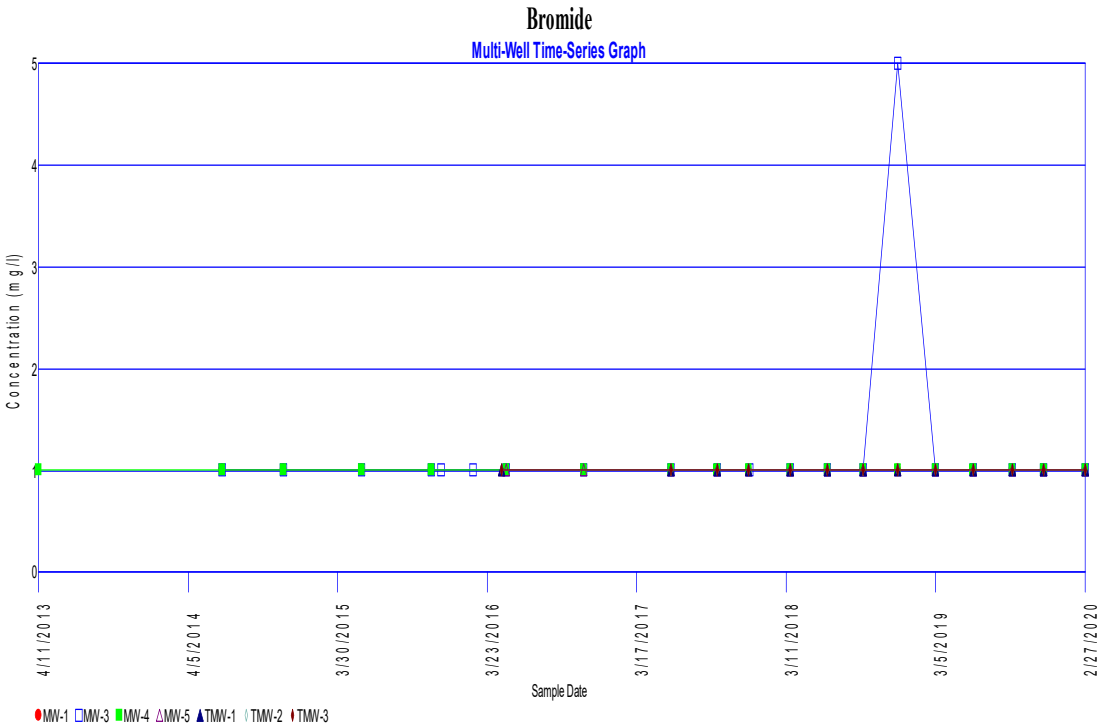
Barium



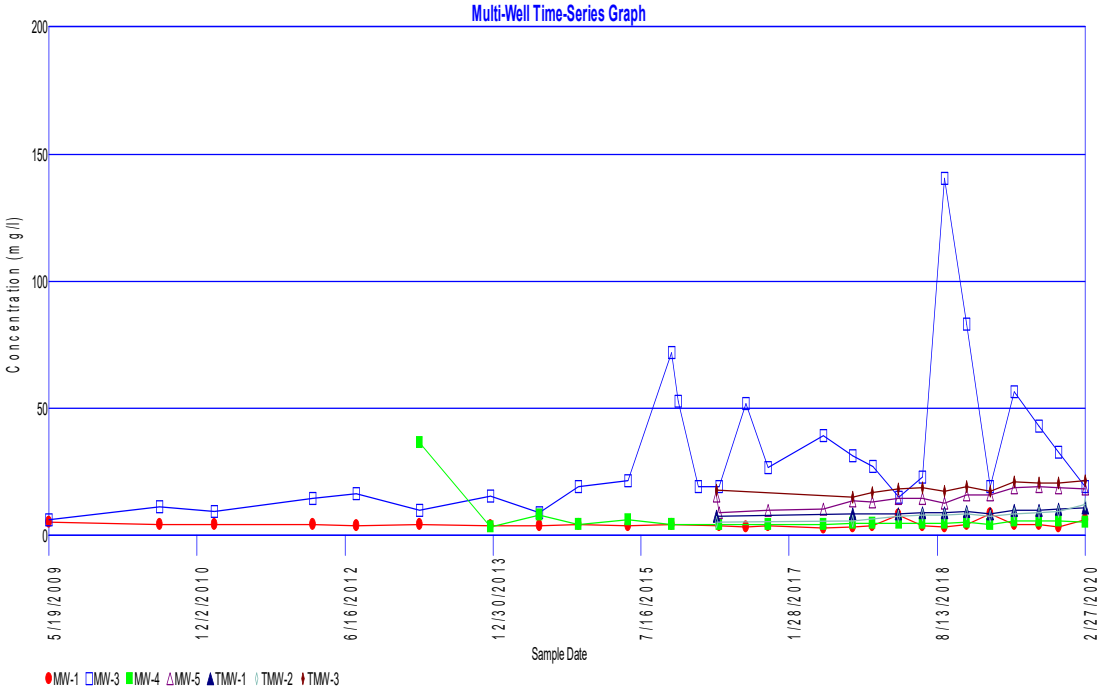
Beryllium



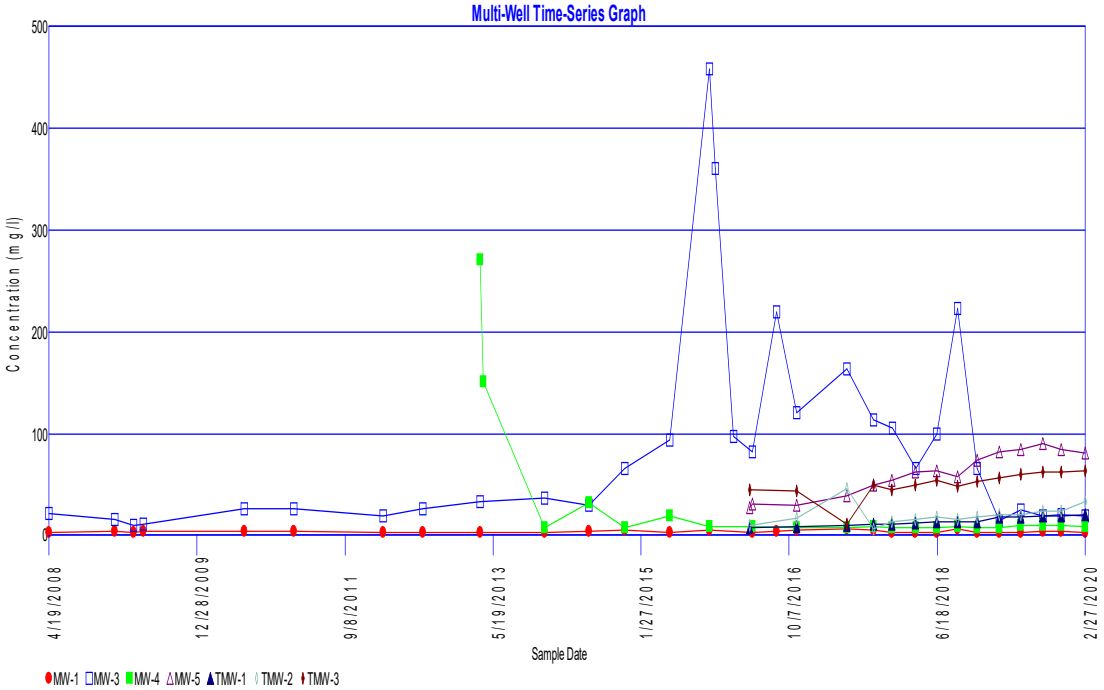

Boron
Multi-Well Time-Series Graph
0.2
0.15
0.1
0.05
0
Concentration (mg/l)
4/19/2008
12/28/2009
9/8/2011
5/19/2013
1/27/2015
10/7/2016
6/18/2018
2/27/2020
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3


Bromide
Multi-Well Time-Series Graph
5
4
3
2
1
0
Concentration (mg/l)
4/11/2013
4/5/2014
3/30/2015
3/23/2016
3/17/2017
3/11/2018
3/5/2019
2/27/2020
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

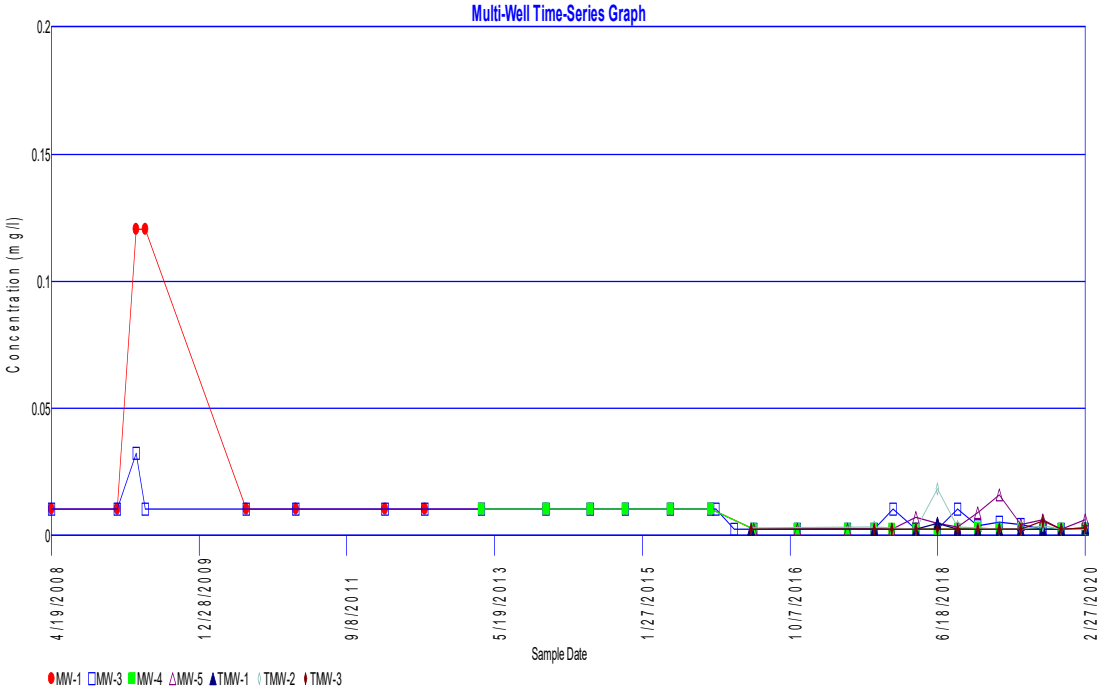
Calcium



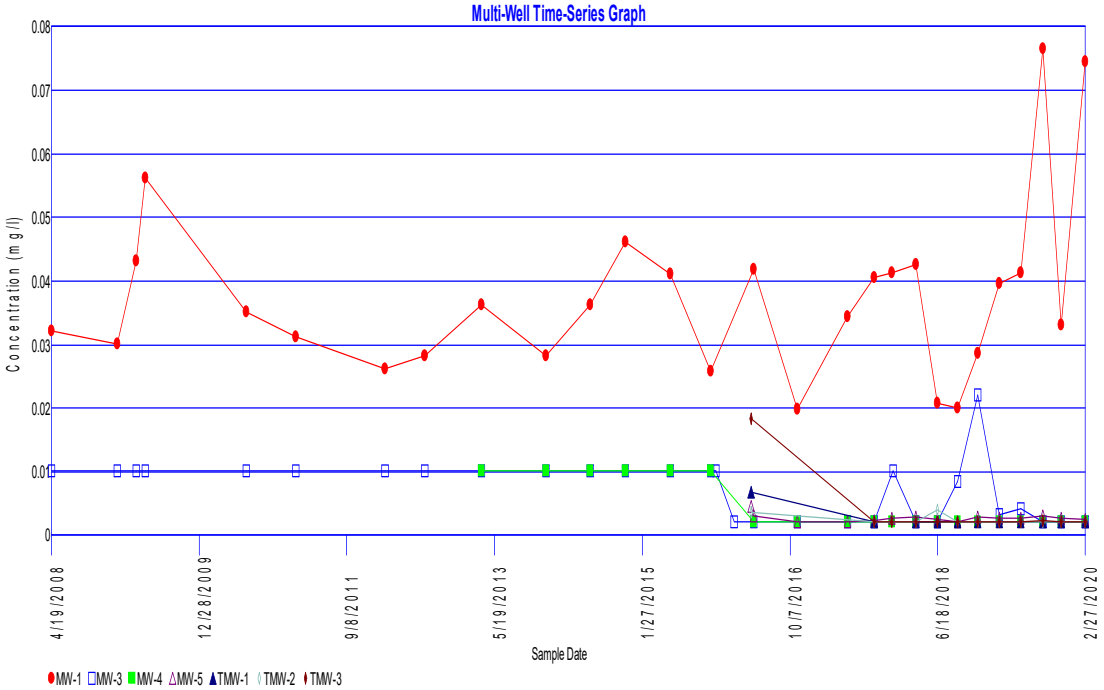
Chloride



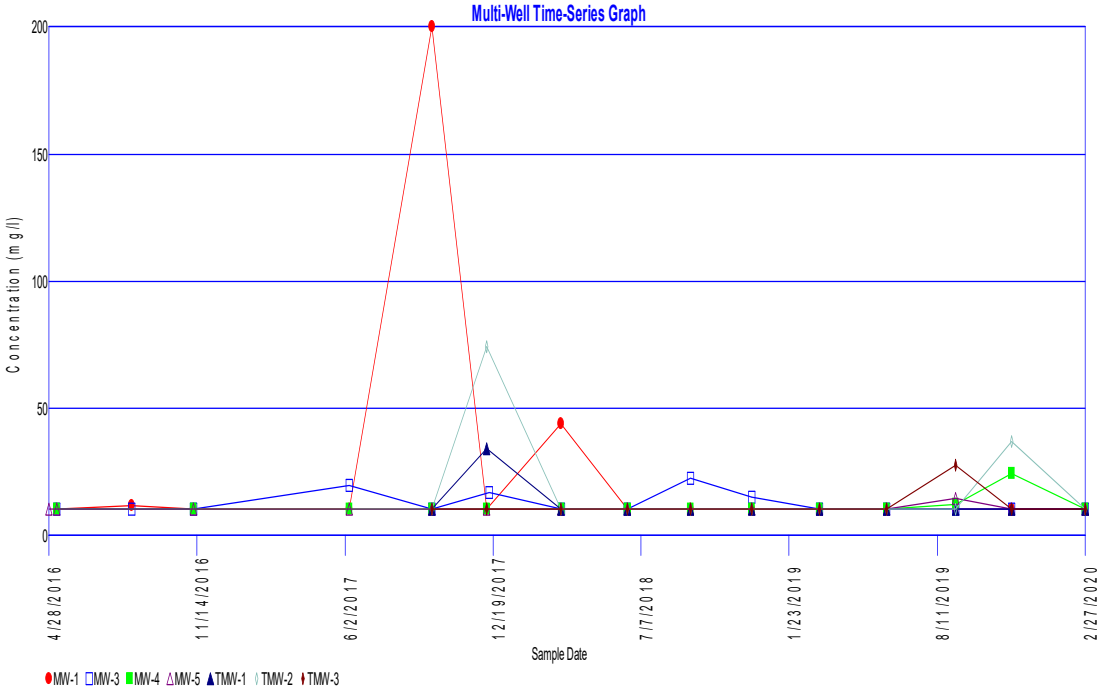
Chromium



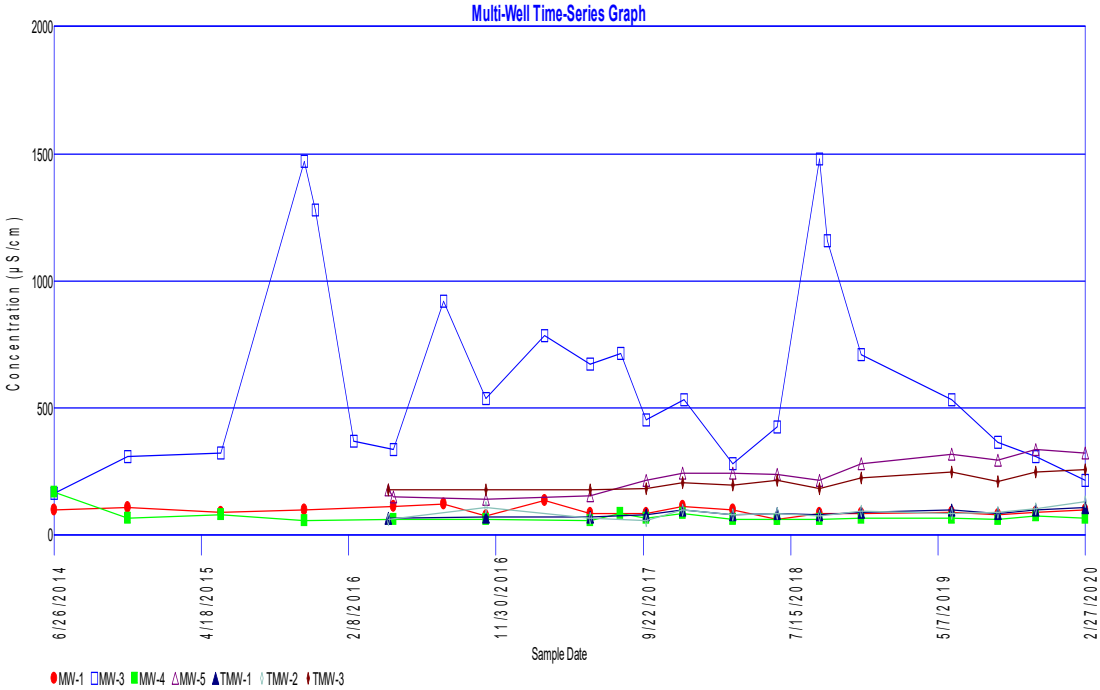
Cobalt



COD

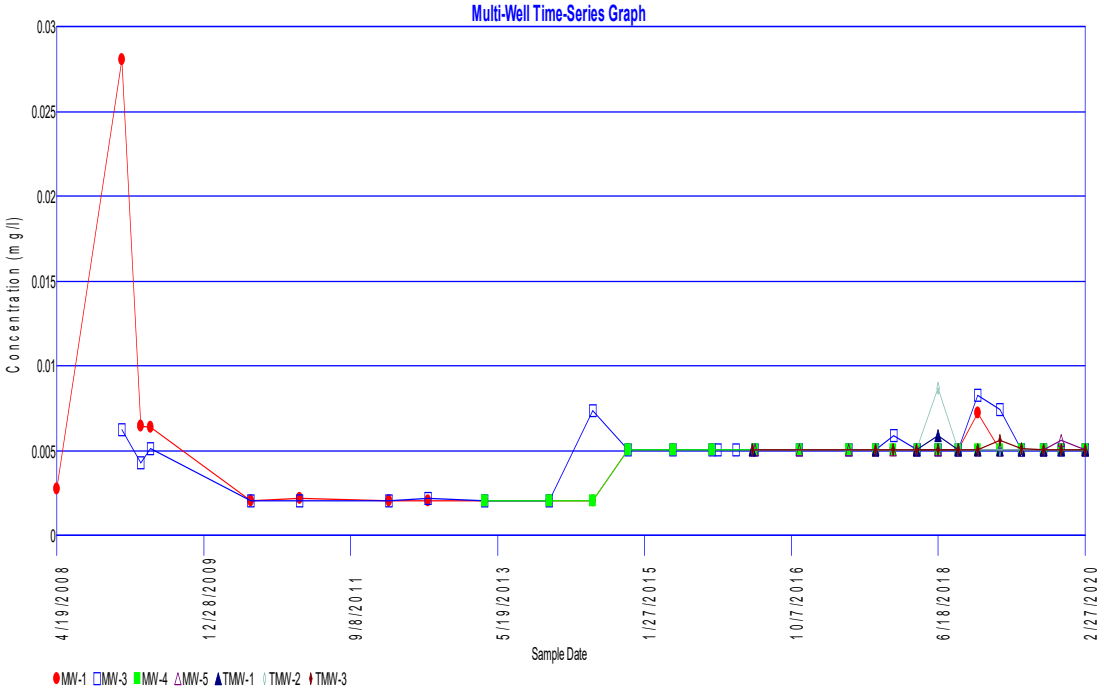


Conductivity



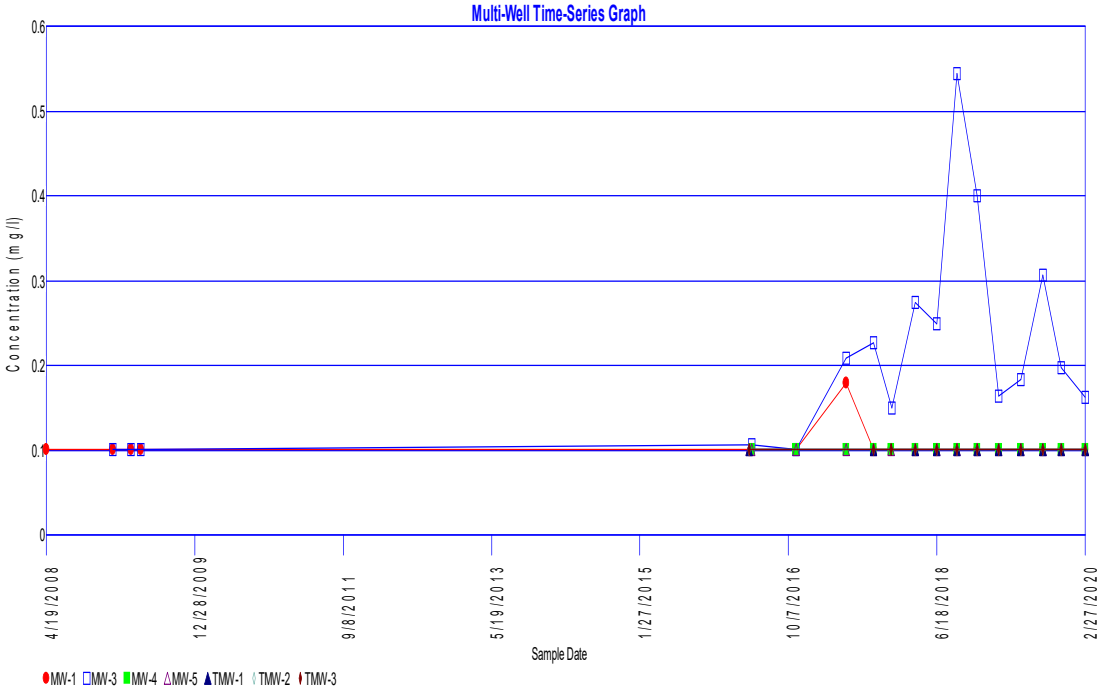
Copper

Multi-Well Time-Series Graph

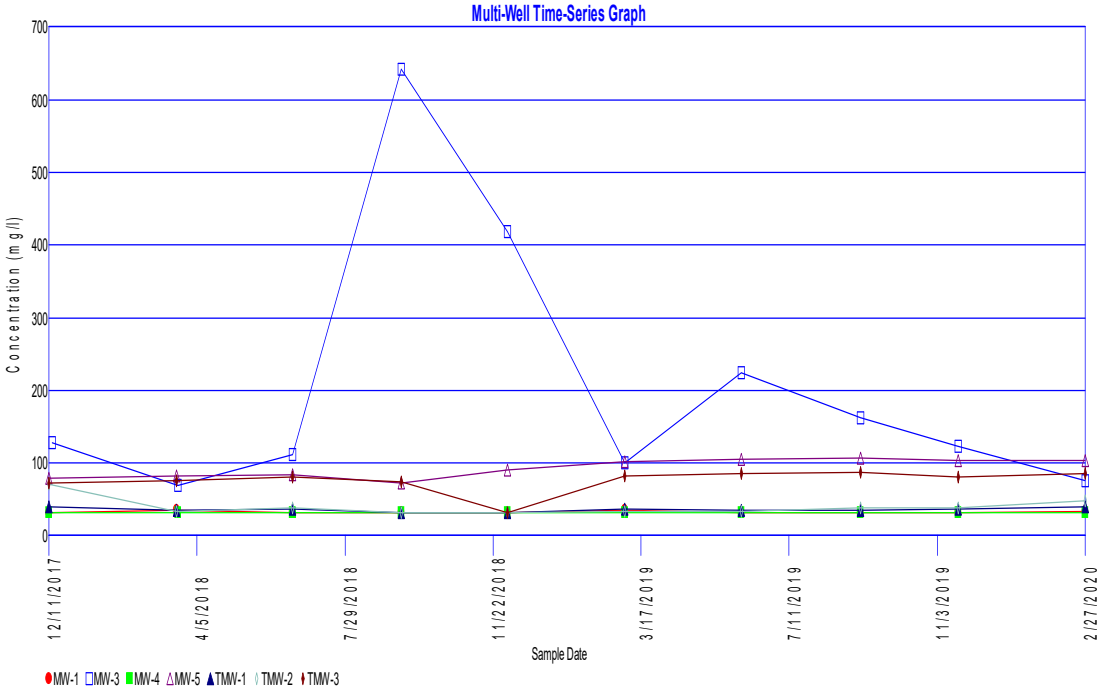


Fluoride

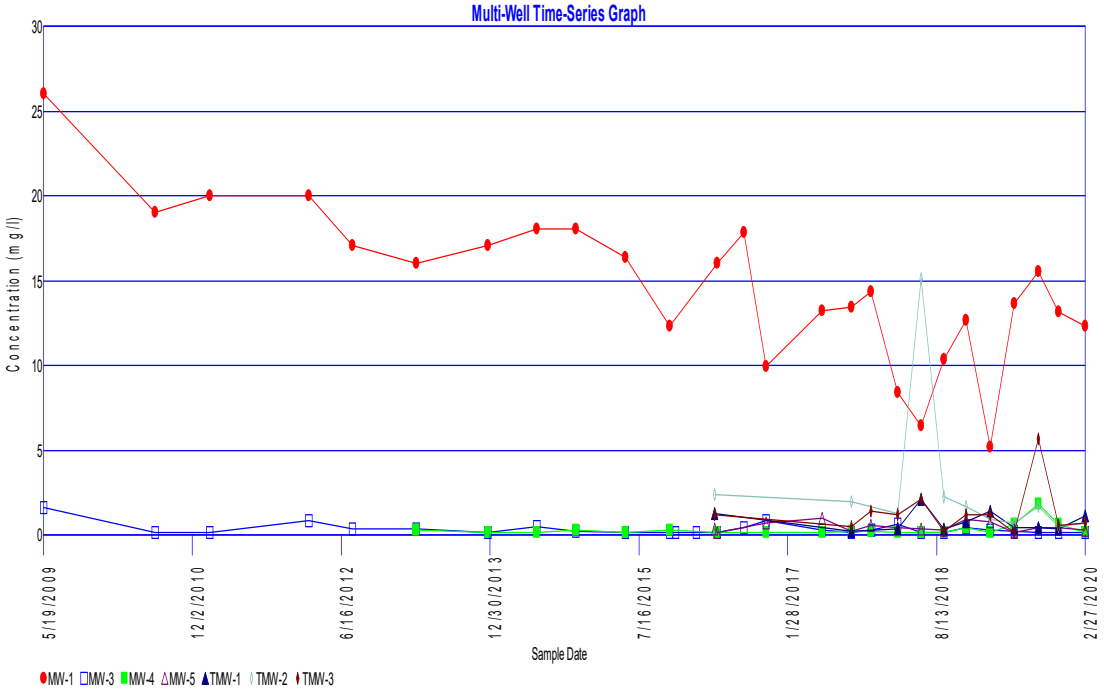
Multi-Well Time-Series Graph



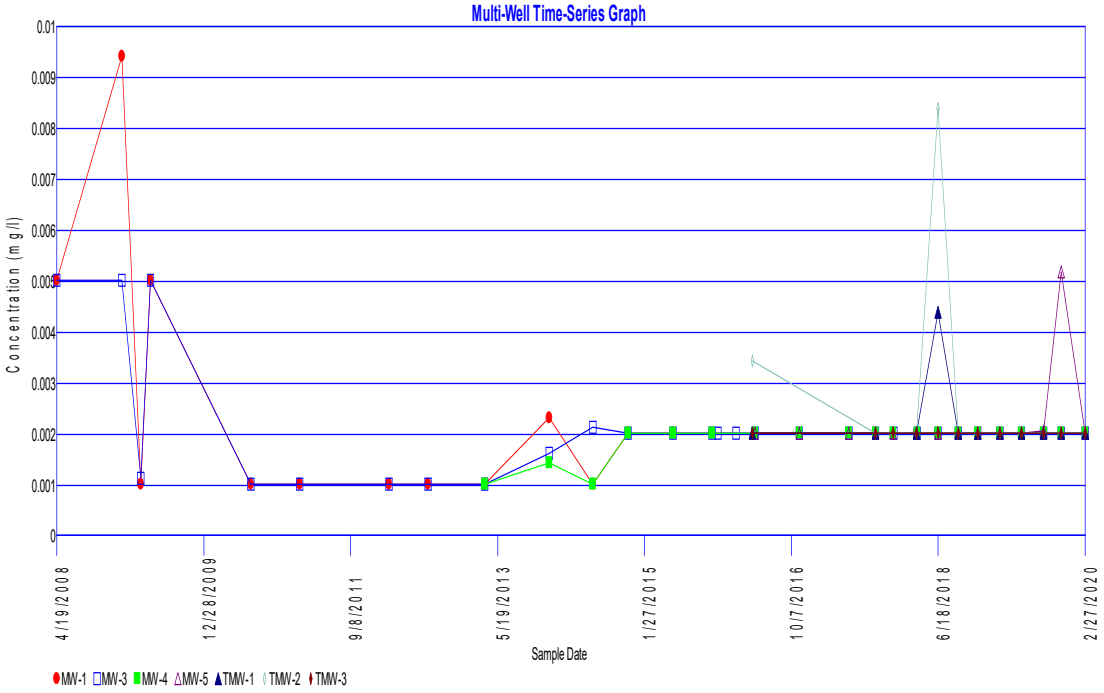
Hardness



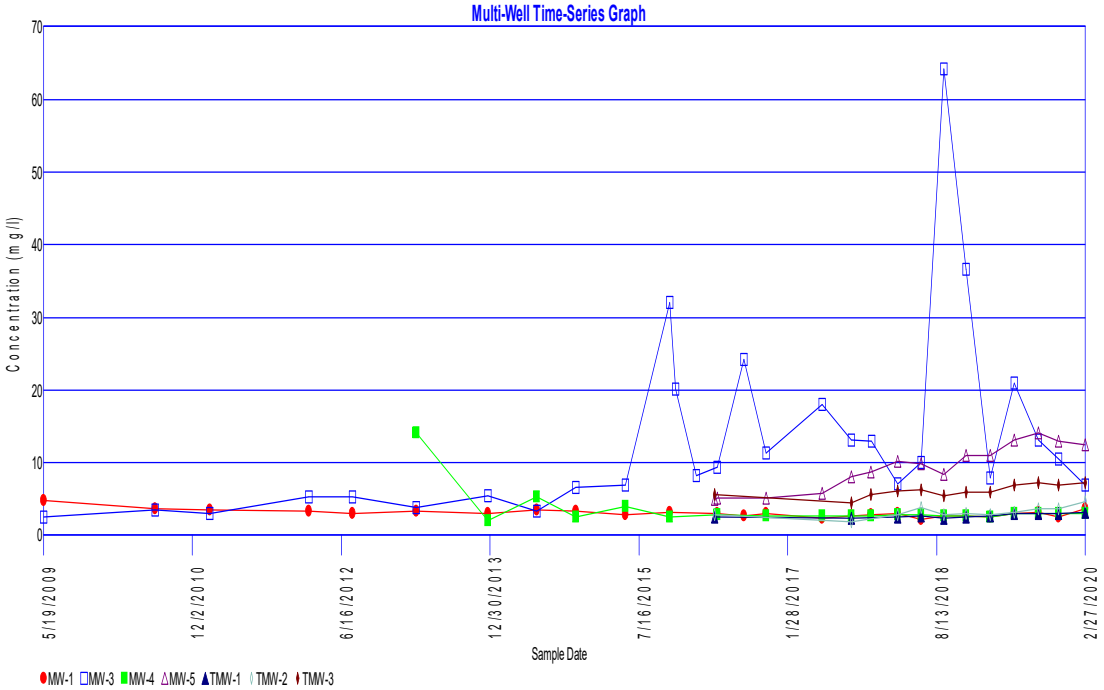
Iron



Lead

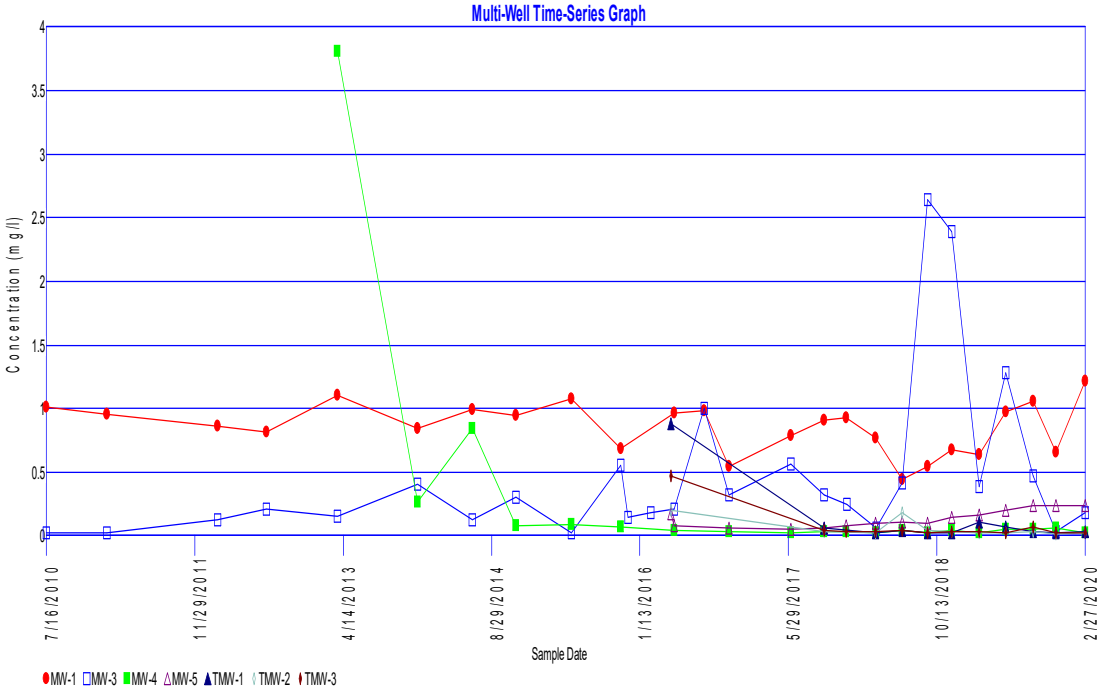


Magnesium



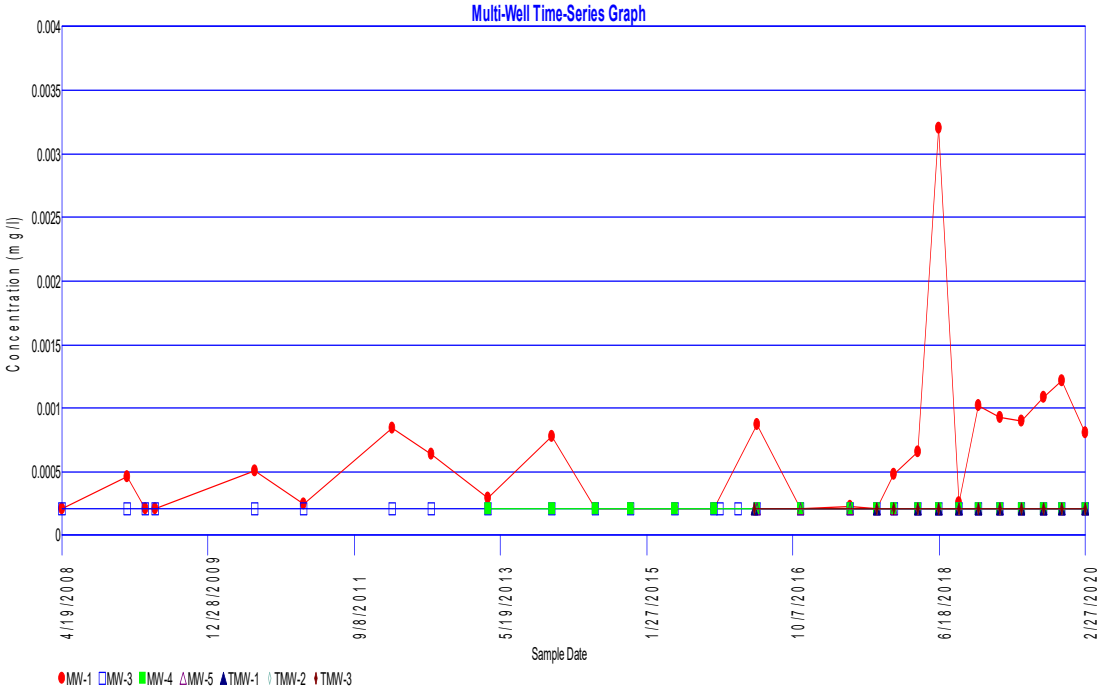
Manganese

Multi-Well Time-Series Graph

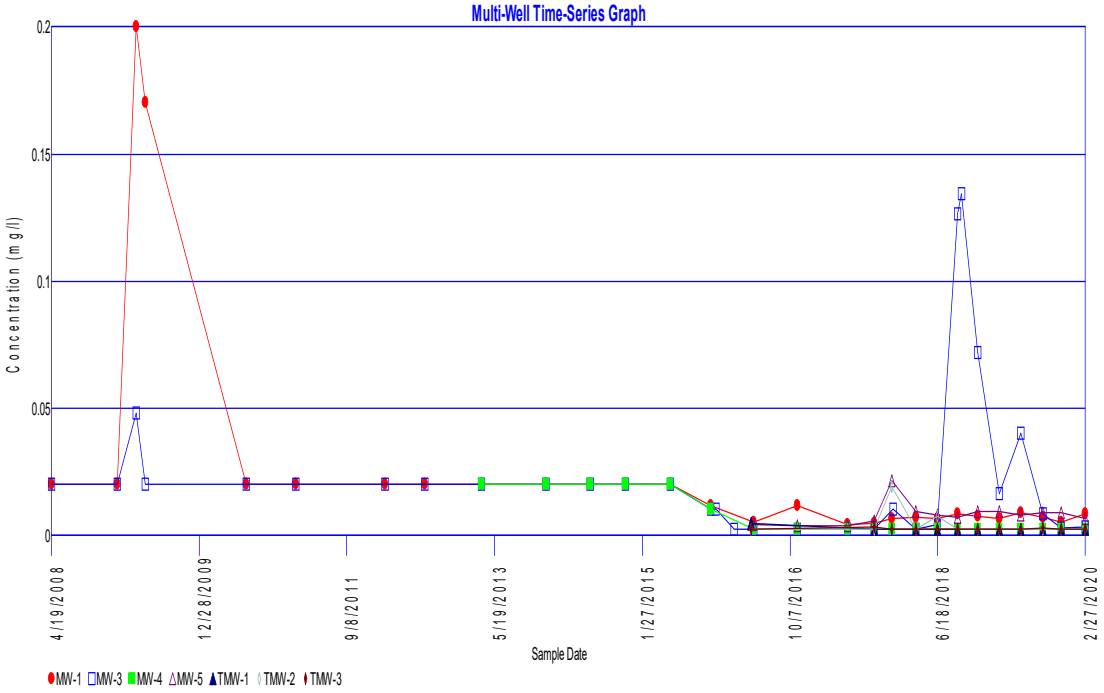


Mercury

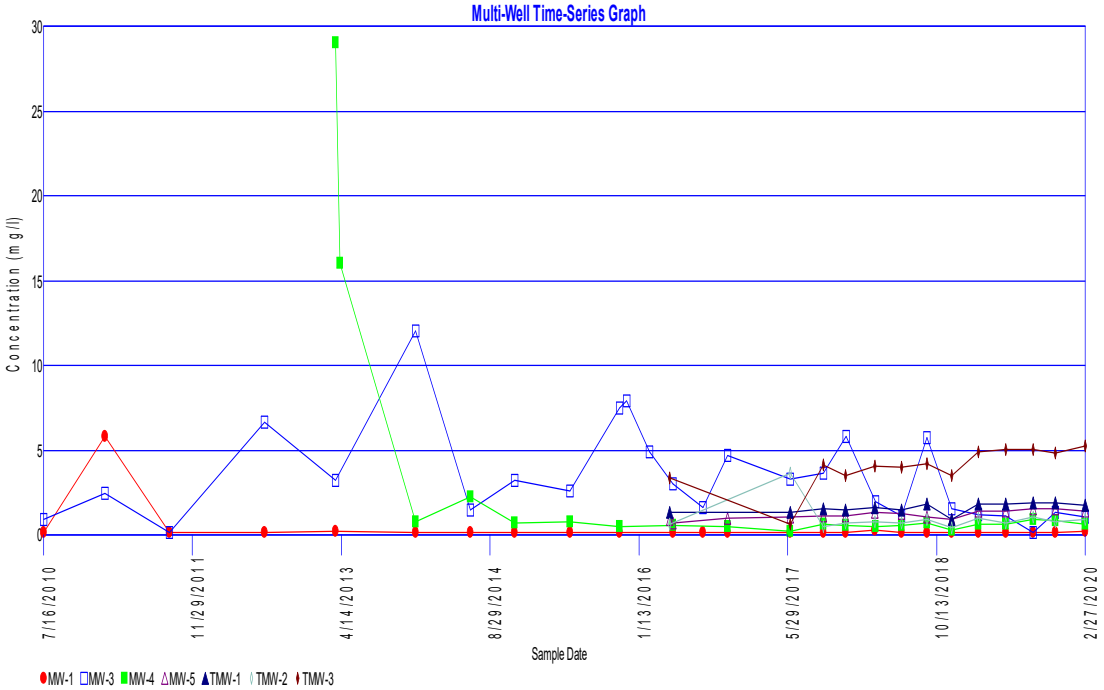
Multi-Well Time-Series Graph

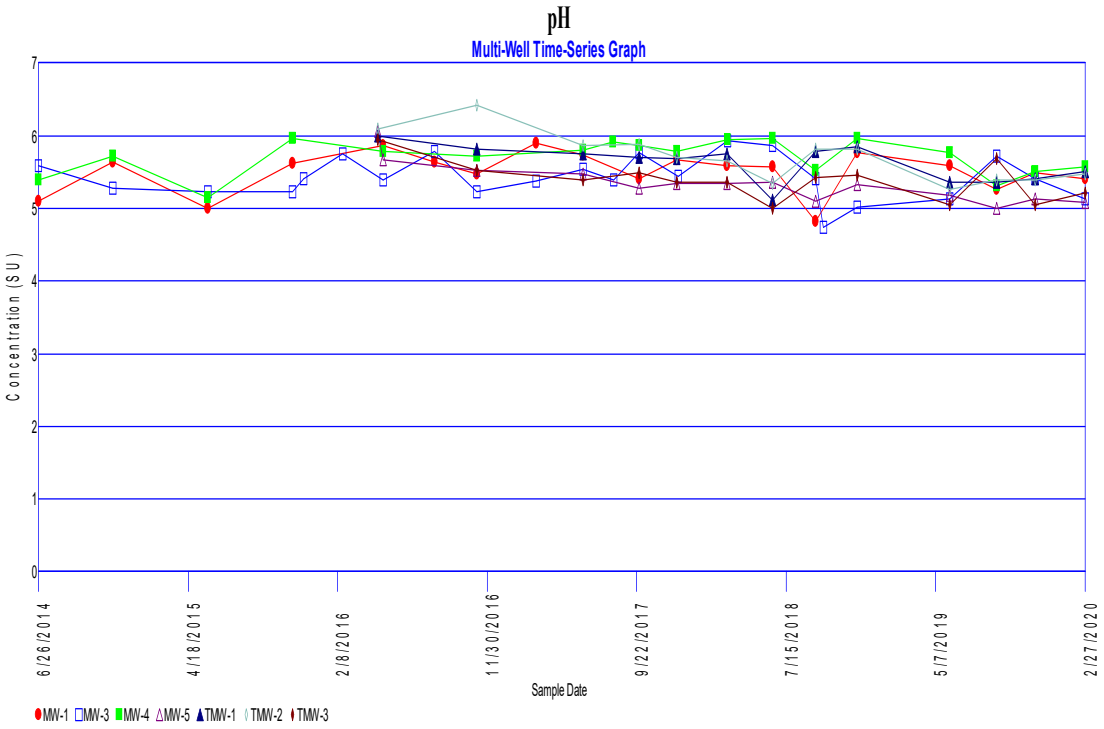


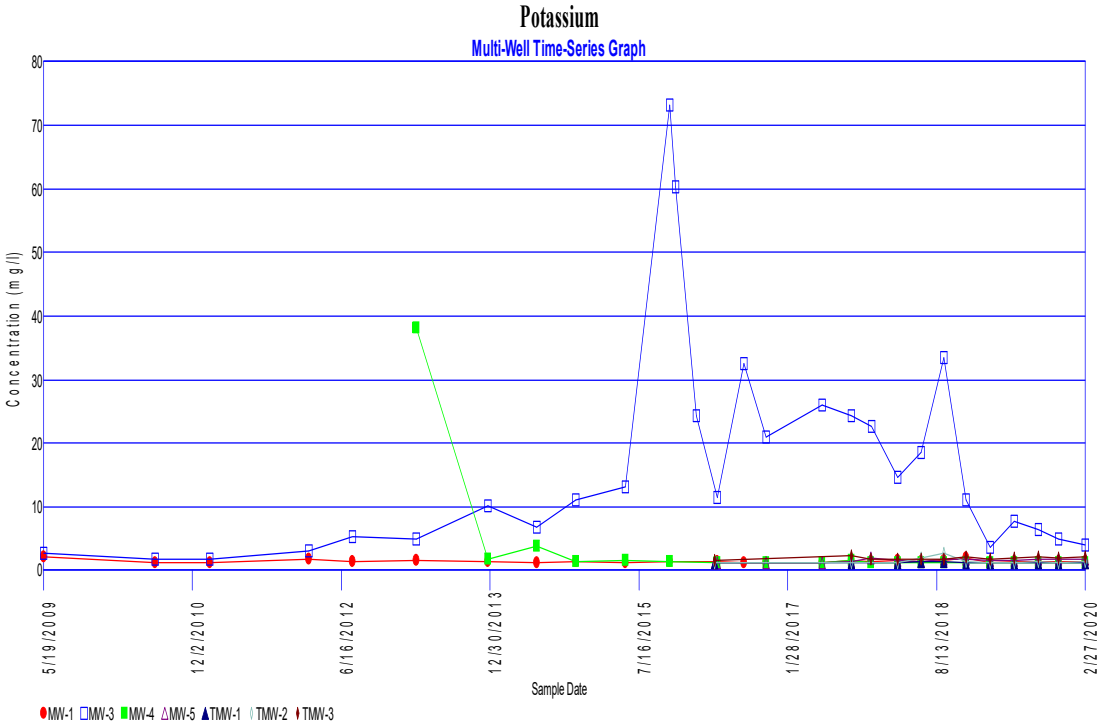
Nickel

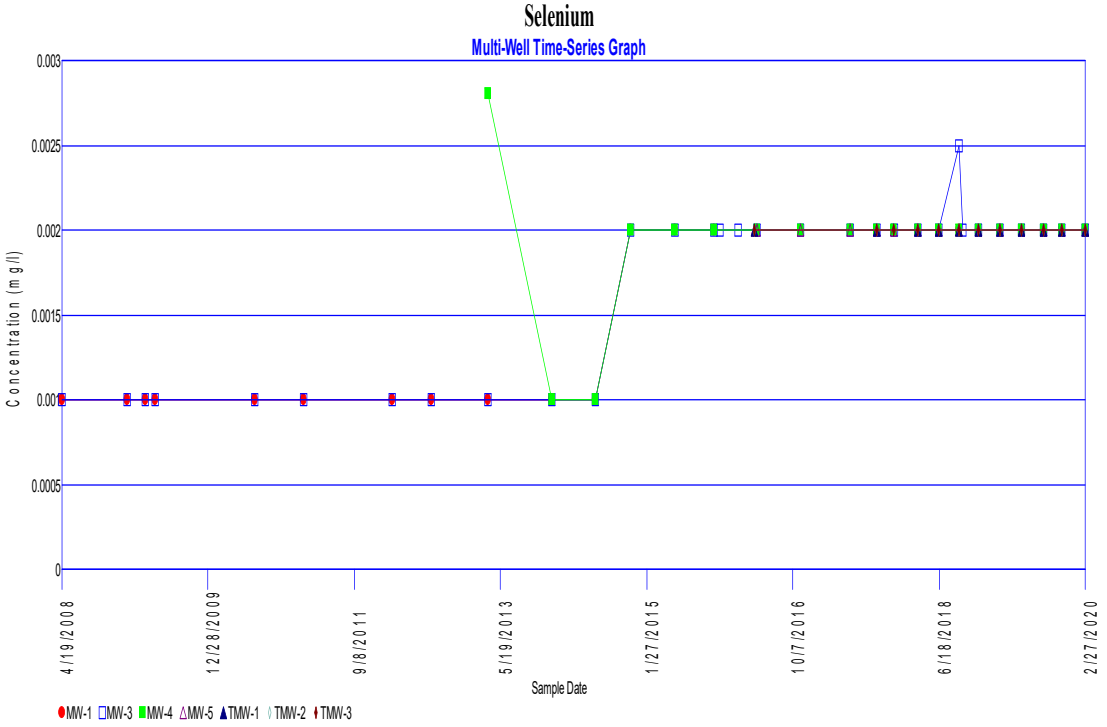


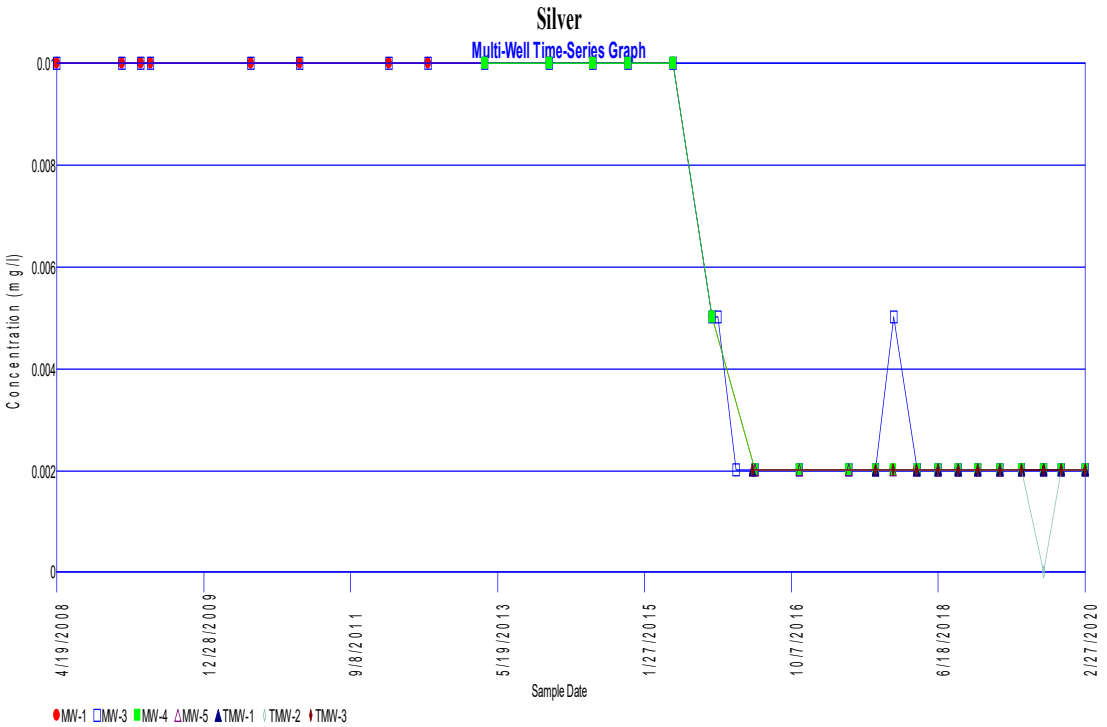
Nitrate



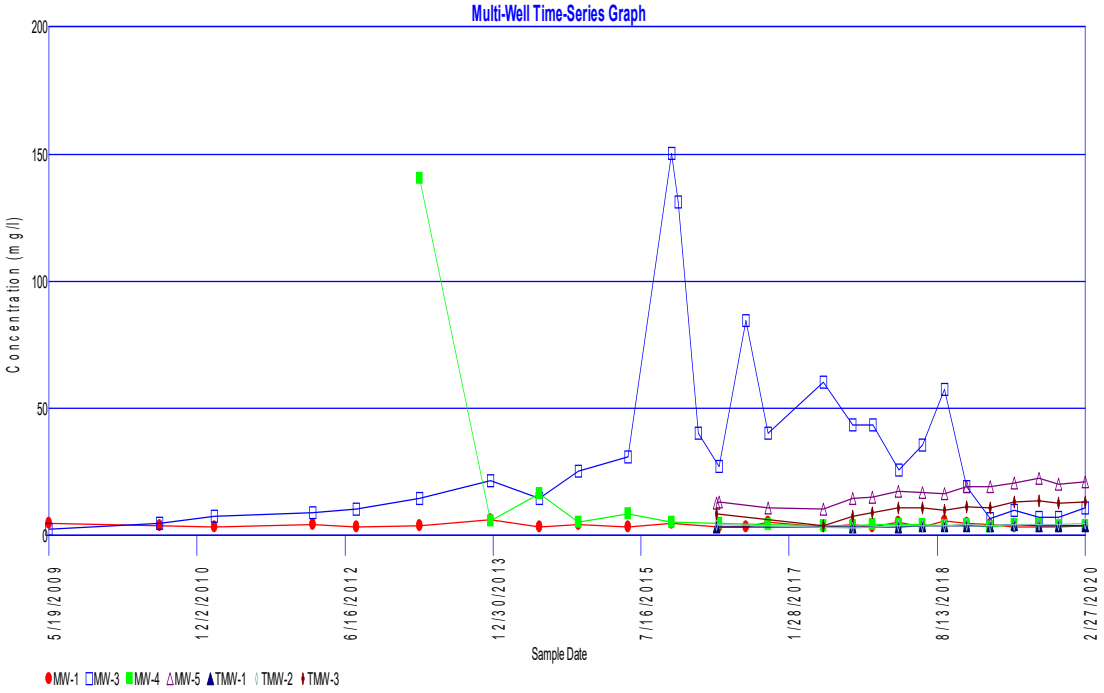

pH
Multi-Well Time-Series Graph
Concentration (SU)
7
6
5
4
3
2
1
0
6/26/2014
4/18/2015
2/8/2016
11/30/2016
9/22/2017
7/15/2018
5/7/2019
2/27/2020
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3


Potassium
Multi-Well Time-Series Graph
Concentration (mg/l)
80
70
60
50
40
30
20
10
0
5/19/2009
12/2/2010
6/16/2012
12/30/2013
7/16/2015
1/28/2017
8/13/2018
2/27/2020
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

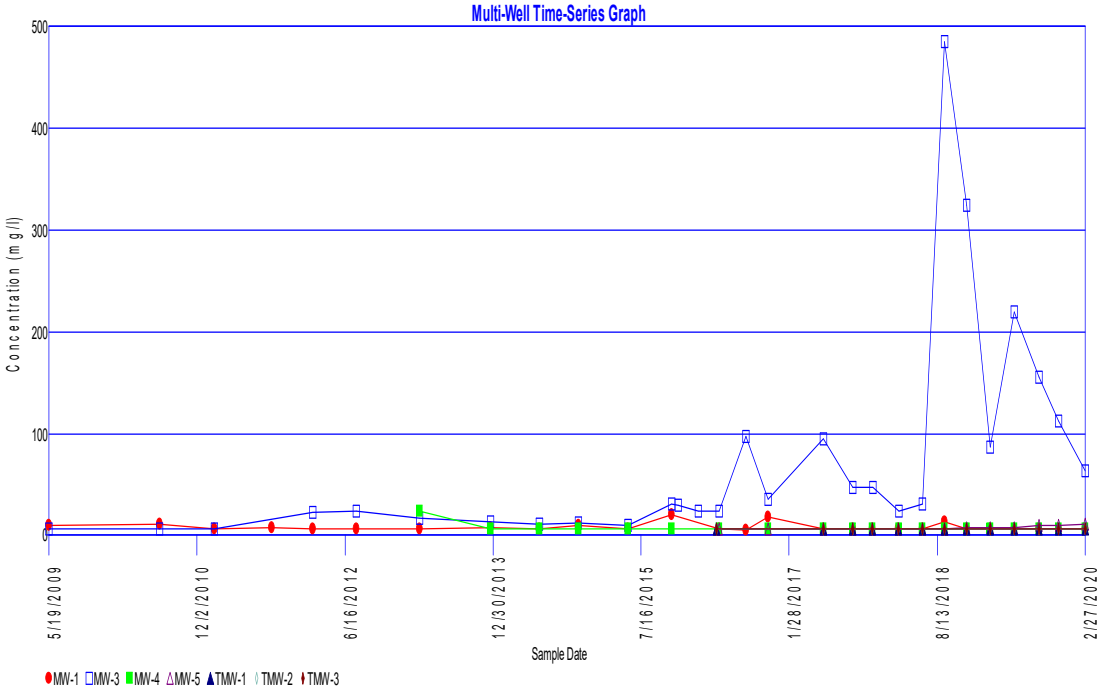

Selenium
Multi-Well Time-Series Graph
0.003
0.0025
0.002
0.0015
0.001
0.0005
0
Concentration (mg/l)
4/19/2008
12/28/2009
9/8/2011
5/19/2013
1/27/2015
10/7/2016
6/18/2018
2/27/2020
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

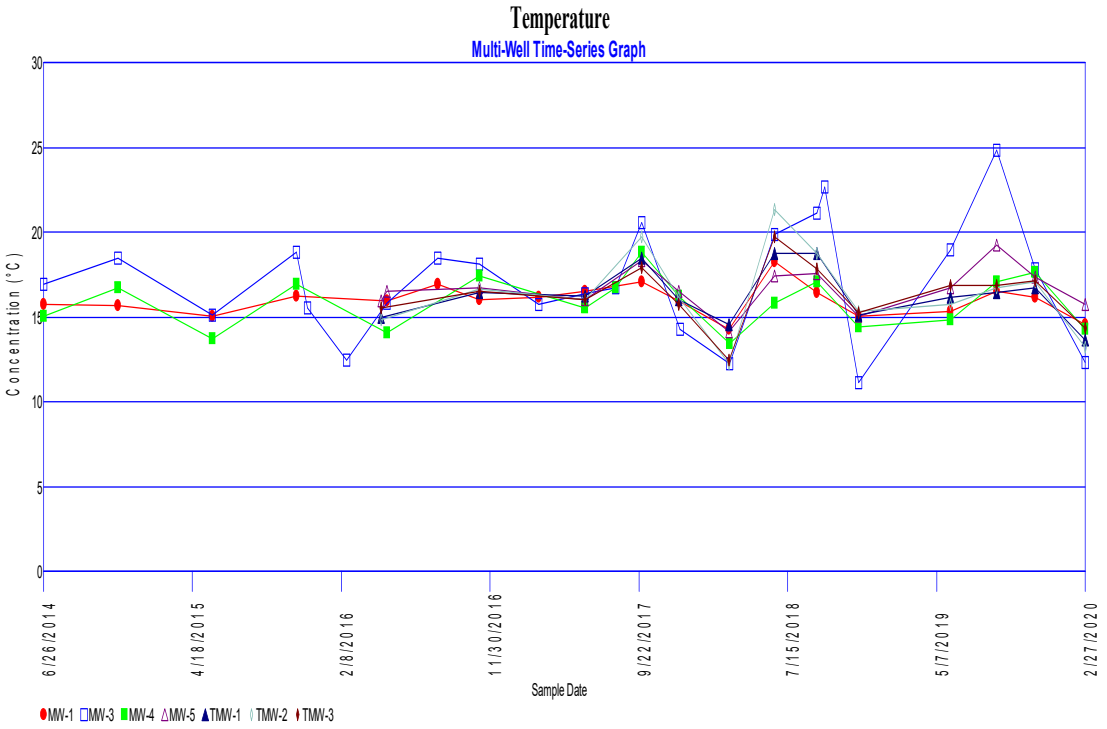

Silver
Multi-Well Time-Series Graph
0.01
0.008
0.006
0.004
0.002
0
Concentration (mg/l)
4/19/2008
12/28/2009
9/8/2011
5/19/2013
1/27/2015
10/7/2016
6/18/2018
2/27/2020
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

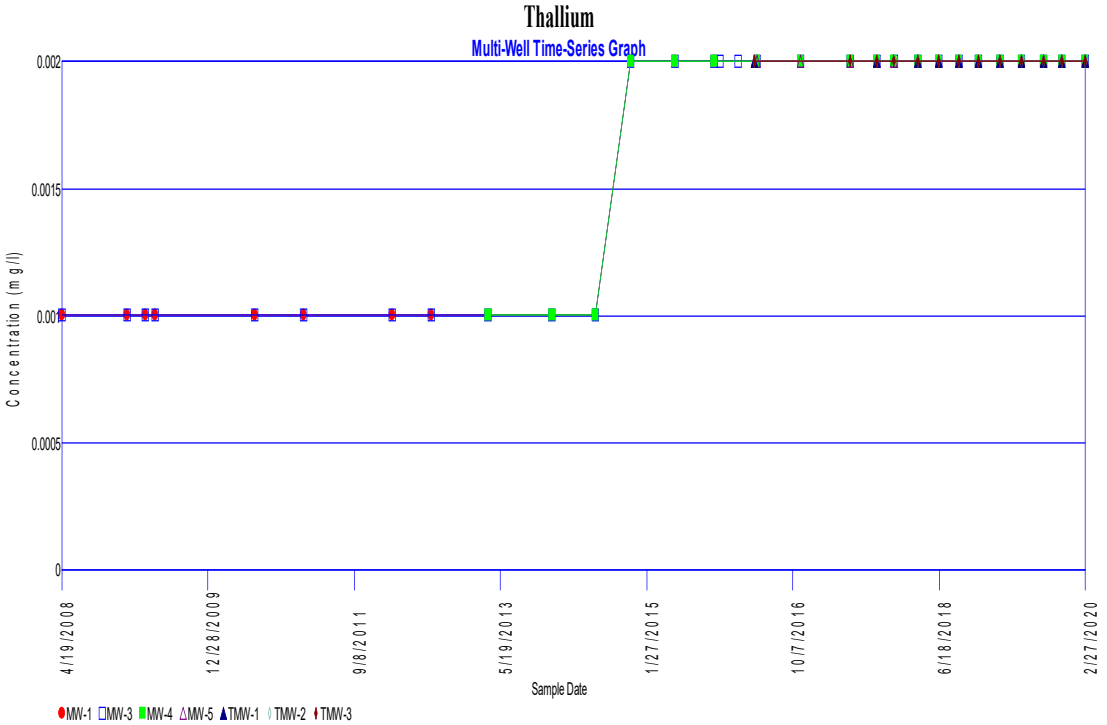
Sodium



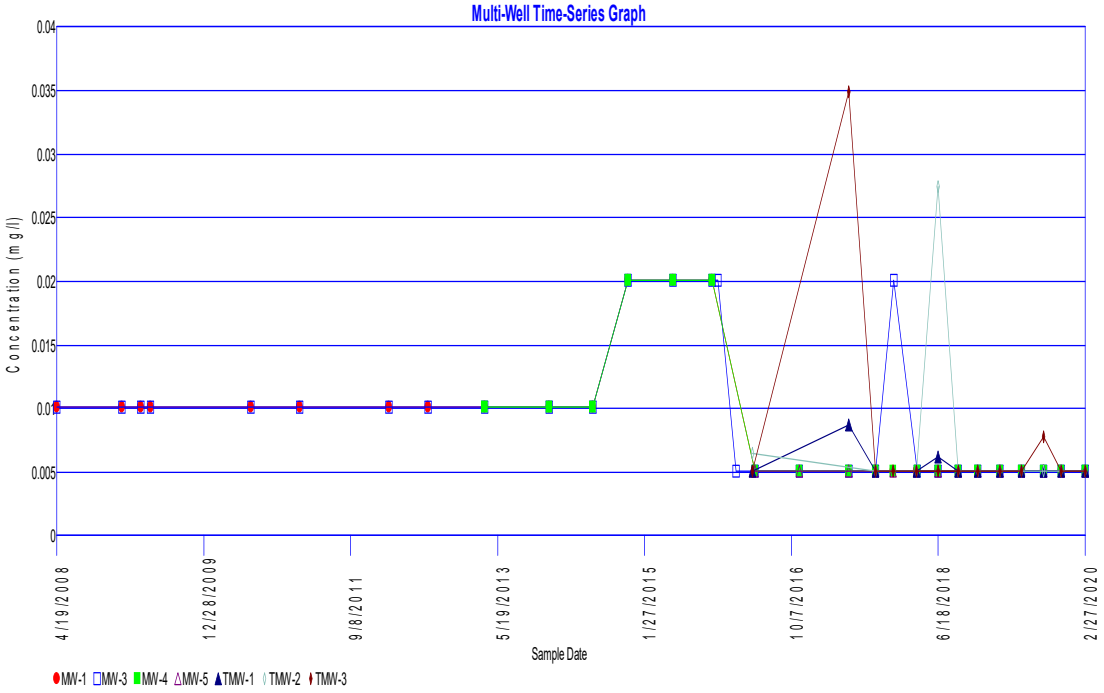
Sulfate



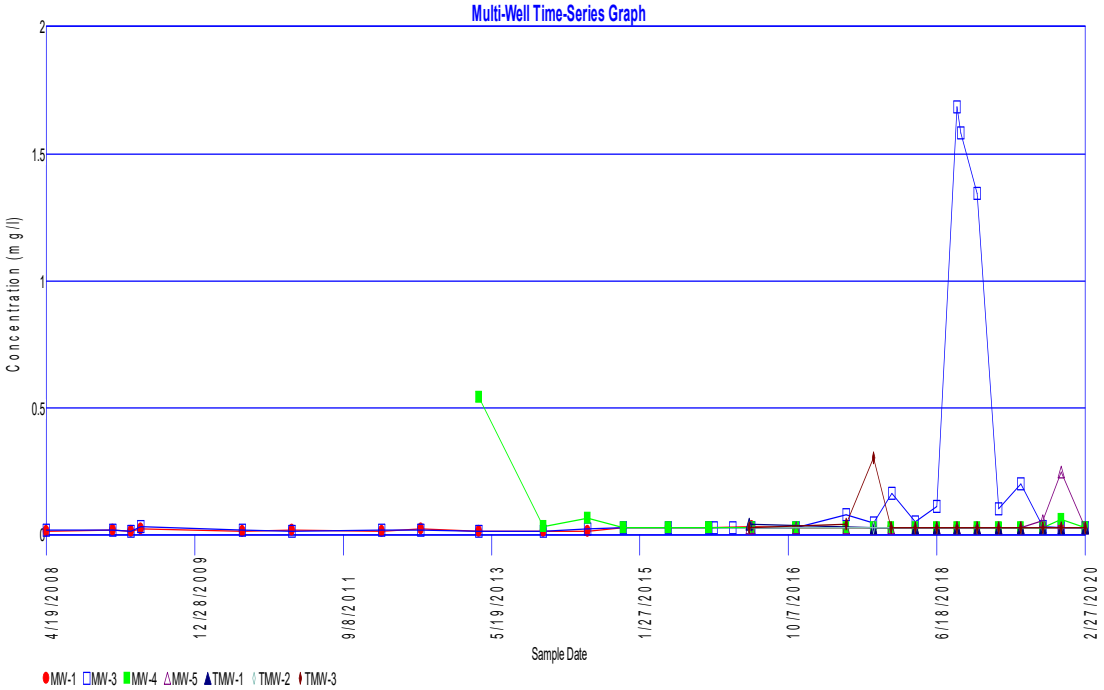

Temperature
Multi-Well Time-Series Graph
Concentration (°C)
30
25
20
15
10
5
0
6/26/2014
4/18/2015
2/8/2016
11/30/2016
9/22/2017
7/15/2018
5/7/2019
2/27/2020
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3


Thallium
Multi-Well Time-Series Graph
Concentration (mg/l)
0.002
0.0015
0.001
0.0005
0
4/19/2008
12/28/2009
9/8/2011
5/19/2013
1/27/2015
10/7/2016
6/18/2018
2/27/2020
Sample Date
MW-1 MW-3 MW-4 MW-5 TMW-1 TMW-2 TMW-3

Vanadium



Zinc



Shapiro-Wilks Test of Normality

Parameter: Arsenic

Background Locations

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 14 for 28 measurements

Sum of b values = 0.145443
Sample Standard Deviation = 0.0290227
W Statistic = 0.930133

5% Critical value of 0.924 is less than 0.930133
Data is normally distributed at 95% level of significance

1% Critical value of 0.896 is less than 0.930133
Data is normally distributed at 99% level of significance

Shapiro-Wilks Test of Normality

Parameter: Barium

Background Locations

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 14 for 28 measurements

Sum of b values = 0.043956
Sample Standard Deviation = 0.0126022
W Statistic = 0.450587

5% Critical value of 0.924 exceeds 0.450587
Evidence of non-normality at 95% level of significance

1% Critical value of 0.896 exceeds 0.450587
Evidence of non-normality at 99% level of significance

Shapiro-Wilks Test of Normality

Parameter: Chloride

Background Locations

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 14 for 29 measurements

Sum of b values = 5.04921
Sample Standard Deviation = 1.04438
W Statistic = 0.834774

5% Critical value of 0.926 exceeds 0.834774
Evidence of non-normality at 95% level of significance

1% Critical value of 0.898 exceeds 0.834774
Evidence of non-normality at 99% level of significance

Shapiro-Wilks Test of Normality

Parameter: Cobalt

Background Locations

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 14 for 28 measurements

Sum of b values = 0.0656165
Sample Standard Deviation = 0.0136384
W Statistic = 0.857305

5% Critical value of 0.924 exceeds 0.857305
Evidence of non-normality at 95% level of significance

1% Critical value of 0.896 exceeds 0.857305
Evidence of non-normality at 99% level of significance

Shapiro-Wilks Test of Normality

Parameter: Nickel

Background Locations

Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
K = 14 for 28 measurements

Sum of b values = 0.153203
Sample Standard Deviation = 0.0458692
W Statistic = 0.41317

5% Critical value of 0.924 exceeds 0.41317
Evidence of non-normality at 95% level of significance

1% Critical value of 0.896 exceeds 0.41317
Evidence of non-normality at 99% level of significance

Shapiro-Wilks Test of Normality

Parameter: Sulfate

Background Locations

Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
K = 13 for 27 measurements

Sum of b values = 14.7808
Sample Standard Deviation = 3.66789
W Statistic = 0.624582

5% Critical value of 0.923 exceeds 0.624582
Evidence of non-normality at 95% level of significance

1% Critical value of 0.894 exceeds 0.624582
Evidence of non-normality at 99% level of significance

Shapiro-Wilks Test of Normality

Parameter: Mercury

Background Locations

Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
K = 14 for 28 measurements

Sum of b values = 0.0025462
Sample Standard Deviation = 0.000603824
W Statistic = 0.658566

5% Critical value of 0.924 exceeds 0.658566
Evidence of non-normality at 95% level of significance

1% Critical value of 0.896 exceeds 0.658566
Evidence of non-normality at 99% level of significance

Shapiro-Wilks Test of Normality

Parameter: Barium

Background Locations

Normality Test of Parameter Concentrations

Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
K = 14 for 28 measurements

Sum of b values = 1.38835
Sample Standard Deviation = 0.320325
W Statistic = 0.695754

5% Critical value of 0.924 exceeds 0.695754
Evidence of non-normality at 95% level of significance

1% Critical value of 0.896 exceeds 0.695754
Evidence of non-normality at 99% level of significance

Shapiro-Wilks Test of Normality

Parameter: Chloride

Background Locations

Normality Test of Parameter Concentrations

Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
K = 14 for 29 measurements

Sum of b values = 1.70931
Sample Standard Deviation = 0.336577
W Statistic = 0.921115

5% Critical value of 0.926 exceeds 0.921115
Evidence of non-normality at 95% level of significance

1% Critical value of 0.898 is less than 0.921115
Data is normally distributed at 99% level of significance

Shapiro-Wilks Test of Normality

Parameter: Cobalt

Background Locations

Normality Test of Parameter Concentrations

Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
K = 14 for 28 measurements

Sum of b values = 1.69332
Sample Standard Deviation = 0.333904
W Statistic = 0.952507

5% Critical value of 0.924 is less than 0.952507
Data is normally distributed at 95% level of significance

1% Critical value of 0.896 is less than 0.952507
Data is normally distributed at 99% level of significance

Shapiro-Wilks Test of Normality

Parameter: Nickel

Background Locations

Normality Test of Parameter Concentrations

Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
K = 14 for 28 measurements

Sum of b values = 3.49798
Sample Standard Deviation = 0.872556
W Statistic = 0.595229

5% Critical value of 0.924 exceeds 0.595229
Evidence of non-normality at 95% level of significance

1% Critical value of 0.896 exceeds 0.595229
Evidence of non-normality at 99% level of significance

Shapiro-Wilks Test of Normality

Parameter: Sulfate

Background Locations

Normality Test of Parameter Concentrations

Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
K = 13 for 27 measurements

Sum of b values = 2.99699
Sample Standard Deviation = 0.671797
W Statistic = 0.765455

5% Critical value of 0.923 exceeds 0.765455
Evidence of non-normality at 95% level of significance

1% Critical value of 0.894 exceeds 0.765455
Evidence of non-normality at 99% level of significance

Shapiro-Wilks Test of Normality

Parameter: Mercury

Background Locations

Normality Test of Parameter Concentrations

Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
K = 14 for 28 measurements

Sum of b values = 5.05457
Sample Standard Deviation = 1.0387
W Statistic = 0.877046

5% Critical value of 0.924 exceeds 0.877046
Evidence of non-normality at 95% level of significance

1% Critical value of 0.896 exceeds 0.877046
Evidence of non-normality at 99% level of significance

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-1

Parameter: Nickel

Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL

Intra-Well Unified Guid. Formula 95% One-Sided Comparison

Baseline Samples	Date	Result
	4/19/2008	ND<-4.60517
	1/21/2009	ND<-4.60517
	4/9/2009	-1.60944
	5/19/2009	-1.77196
	7/16/2010	ND<-4.60517
	2/8/2011	ND<-4.60517
	2/17/2012	ND<-4.60517
	7/31/2012	ND<-4.60517
	3/27/2013	ND<-4.60517
	12/23/2013	ND<-4.60517
	6/26/2014	ND<-4.60517
	11/21/2014	ND<-4.60517
	5/28/2015	ND<-4.60517
	11/11/2015	-4.49184
	5/9/2016	-5.2746
	11/10/2016	-4.49184
	6/8/2017	-5.47744
	9/28/2017	-5.41485
	12/11/2017	-5.03288
	3/21/2018	-5.02372
	6/19/2018	-5.05616
	9/12/2018	-4.78071
	12/4/2018	-4.90088
	3/5/2019	-5.05459
	6/4/2019	-4.733
	9/5/2019	-4.98205
	11/20/2019	-5.36446

From 27 baseline samples
Baseline mean = -4.59694
Baseline std Dev = 0.888096

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.05/1) = 95 %
t is Percentile of Student's T-Test (0.95/1) = 0.95
Degrees of Freedom = 27 (background observations) - 1
t(0.95, 27) = 1.70562

Date	Samples	Mean	Interval	Significant
2/27/2020	1	-4.82457	[0, -3.05439]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-1

Parameter: Arsenic

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 95% One-Sided Comparison

Baseline Samples	Date	Result
	4/19/2008	0.024
	1/21/2009	0.072
	4/9/2009	0.067
	5/19/2009	0.064
	7/16/2010	0.074
	2/8/2011	0.086
	2/17/2012	0.093
	7/31/2012	0.089
	3/27/2013	0.049
	12/23/2013	0.1
	6/26/2014	0.063
	11/21/2014	0.059
	5/28/2015	0.0604
	11/11/2015	0.0469
	5/9/2016	0.05
	11/10/2016	0.0286
	6/8/2017	0.0571
	9/28/2017	0.0199
	12/11/2017	0.0573
	3/21/2018	0.0101
	6/19/2018	0.0063
	9/12/2018	0.0184
	12/4/2018	0.0254
	3/5/2019	0.00449
	6/4/2019	0.0194
	9/5/2019	0.0176
	11/20/2019	0.0176

From 27 baseline samples
Baseline mean = 0.0473885
Baseline std Dev = 0.0285898

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.05/1) = 95 %
t is Percentile of Student's T-Test (0.95/1) = 0.95
Degrees of Freedom = 27 (background observations) - 1
t(0.95, 27) = 1.70562

Date	Samples	Mean	Interval	Significant
2/27/2020	1	0.00807	[0, 0.0970465]	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW-1

Parameter: Barium

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Future Samples (k) = 1
Recent Dates = 1
Baseline Measurements (n) = 27
Maximum Baseline Concentration = 0.084
Confidence Level = 96.4%
False Positive Rate = 3.6%

Baseline Measurem	Date	Value
	4/19/2008	0.084
	1/21/2009	0.028
	4/9/2009	0.028
	5/19/2009	0.033
	7/16/2010	0.021
	2/8/2011	0.021
	2/17/2012	0.022
	7/31/2012	0.019
	3/27/2013	0.018
	12/23/2013	0.017
	6/26/2014	0.018
	11/21/2014	0.02
	5/28/2015	0.0188
	11/11/2015	0.0237
	5/9/2016	0.02
	11/10/2016	0.0207
	6/8/2017	0.0146
	9/28/2017	0.0175
	12/11/2017	0.0166
	3/21/2018	0.0212
	6/19/2018	0.0163
	9/12/2018	0.0186
	12/4/2018	0.0199
	3/5/2019	0.0184
	6/4/2019	0.0219
	9/5/2019	0.0199
	11/20/2019	0.0194

Date	Count	Mean	Significant
2/27/2020	1	0.0241	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW-1

Parameter: Chloride

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Future Samples (k) = 1
Recent Dates = 1
Baseline Measurements (n) = 27
Maximum Baseline Concentration = 5.68
Confidence Level = 96.4%
False Positive Rate = 3.6%

Baseline Measurem	Date	Value
	4/19/2008	2
	1/21/2009	2.9
	4/9/2009	1.9
	5/19/2009	2.8
	7/16/2010	2.8
	2/8/2011	2.6
	2/17/2012	2.1
	7/31/2012	2.2
	3/27/2013	1.8
	12/23/2013	1.5
	6/26/2014	2.9
	11/21/2014	3.9
	5/28/2015	2.01
	11/11/2015	3.97
	5/9/2016	2.12
	8/18/2016	2.4
	11/10/2016	4.59
	6/8/2017	5.68
	9/28/2017	4.11
	12/11/2017	2.31
	3/21/2018	2.1
	6/19/2018	2.24
	9/12/2018	4.94
	12/4/2018	1.67
	3/5/2019	2.11
	6/4/2019	2.15
	9/5/2019	2.84

Date	Count	Mean	Significant
2/27/2020	1	1.95	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW-1

Parameter: Nickel

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 40.7407%
Future Samples (k) = 1
Recent Dates = 1
Baseline Measurements (n) = 27
Maximum Baseline Concentration = 0.2
Confidence Level = 96.4%
False Positive Rate = 3.6%

Baseline Measurem	Date	Value
	4/19/2008	ND<0.02
	1/21/2009	ND<0.02
	4/9/2009	0.2
	5/19/2009	0.17
	7/16/2010	ND<0.02
	2/8/2011	ND<0.02
	2/17/2012	ND<0.02
	7/31/2012	ND<0.02
	3/27/2013	ND<0.02
	12/23/2013	ND<0.02
	6/26/2014	ND<0.02
	11/21/2014	ND<0.02
	5/28/2015	ND<0.02
	11/11/2015	0.0112
	5/9/2016	0.00512
	11/10/2016	0.0112
	6/8/2017	0.00418
	9/28/2017	0.00445
	12/11/2017	0.00652
	3/21/2018	0.00658
	6/19/2018	0.00637
	9/12/2018	0.00839
	12/4/2018	0.00744
	3/5/2019	0.00638
	6/4/2019	0.0088
	9/5/2019	0.00686
	11/20/2019	0.00468

Date	Count	Mean	Significant
2/27/2020	1	0.00803	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW-1

Parameter: Sulfate

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 55.5556%
Future Samples (k) = 1
Recent Dates = 1
Baseline Measurements (n) = 27
Maximum Baseline Concentration = 18.8
Confidence Level = 96.4%
False Positive Rate = 3.6%

Baseline Measurem	Date	Value
	5/19/2009	8.9
	7/16/2010	9.4
	2/8/2011	5.8
	9/14/2011	6.6
	2/17/2012	ND<5
	7/31/2012	ND<5
	3/27/2013	5.1
	12/23/2013	6.1
	6/26/2014	ND<5
	11/21/2014	9.1
	5/28/2015	ND<5
	11/11/2015	18.8
	5/9/2016	ND<5
	8/18/2016	3.51
	11/10/2016	16.5
	6/8/2017	ND<5
	9/28/2017	ND<5
	12/11/2017	ND<5
	3/21/2018	ND<5
	6/19/2018	ND<5
	9/12/2018	12.3
	12/4/2018	ND<5
	3/5/2019	ND<5
	6/4/2019	ND<5
	9/5/2019	ND<5
	11/20/2019	ND<5
	2/27/2020	5.72

Date	Count	Mean	Significant
2/27/2020	1	5.72	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW-1

Parameter: Mercury

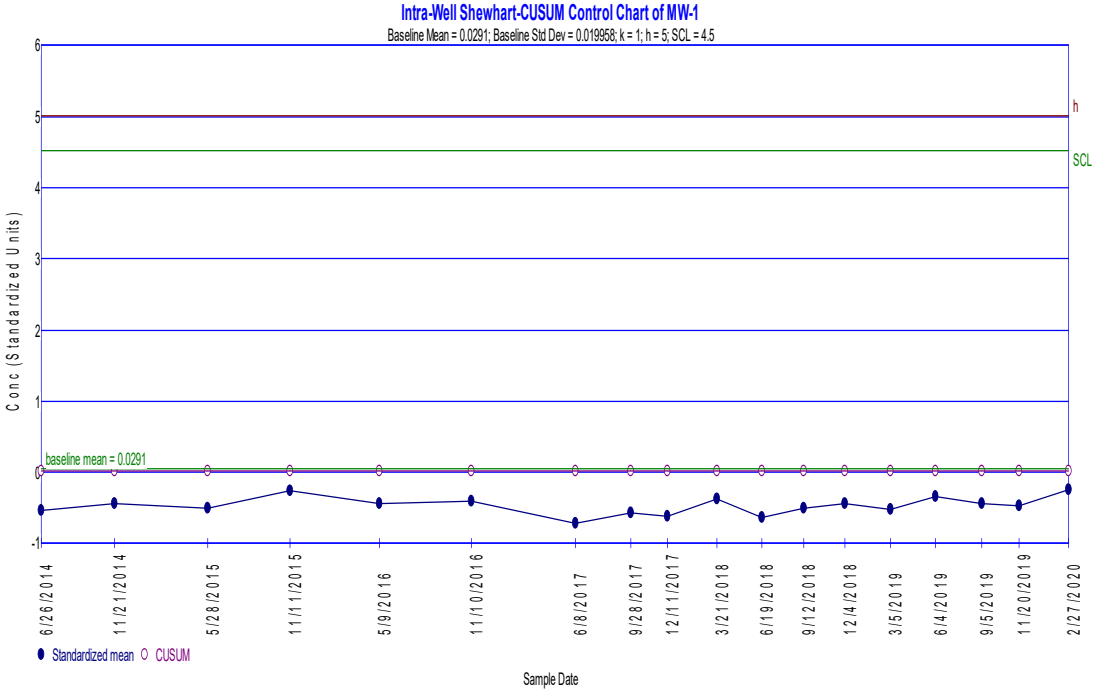
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 33.3333%
Future Samples (k) = 1
Recent Dates = 1
Baseline Measurements (n) = 27
Maximum Baseline Concentration = 0.00319
Confidence Level = 96.4%
False Positive Rate = 3.6%

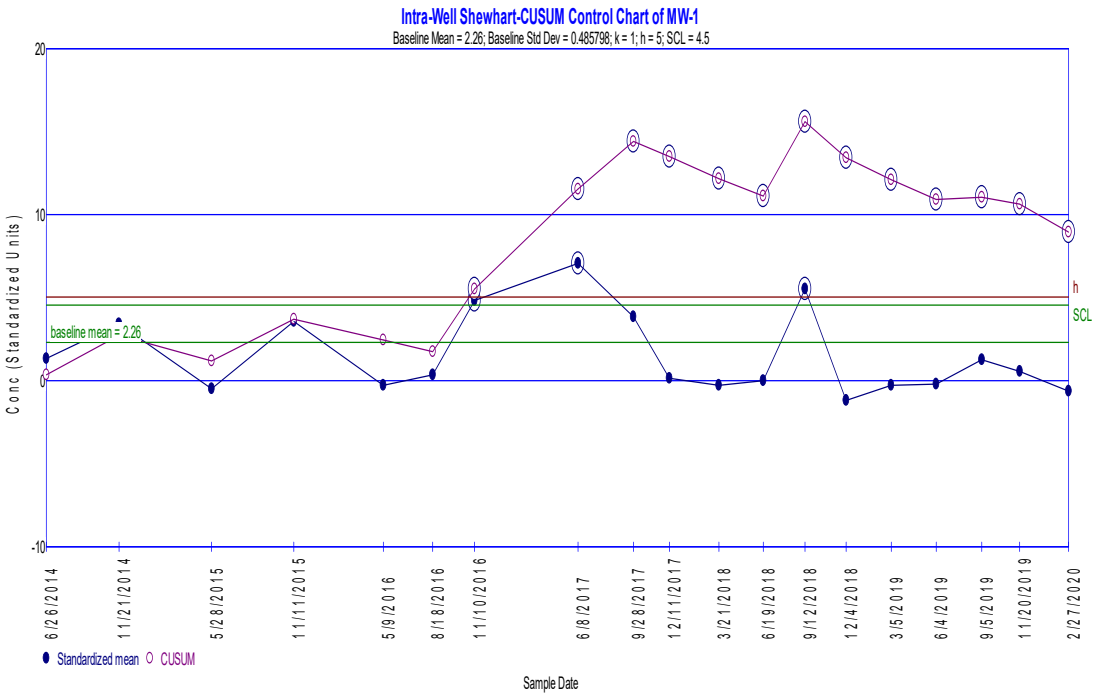
Baseline Measurem	Date	Value
	4/19/2008	ND<0.0002
	1/21/2009	0.00045
	4/9/2009	ND<0.0002
	5/19/2009	ND<0.0002
	7/16/2010	0.0005
	2/8/2011	0.00024
	2/17/2012	0.00083
	7/31/2012	0.00063
	3/27/2013	0.00028
	12/23/2013	0.00077
	6/26/2014	ND<0.0002
	11/21/2014	ND<0.0002
	5/28/2015	ND<0.0002
	11/11/2015	ND<0.0002
	5/9/2016	0.000858
	11/10/2016	ND<0.0002
	6/8/2017	0.000222
	9/28/2017	ND<0.0002
	12/11/2017	0.000473
	3/21/2018	0.000651
	6/19/2018	0.00319
	9/12/2018	0.000244
	12/4/2018	0.00101
	3/5/2019	0.000922
	6/4/2019	0.000889
	9/5/2019	0.00108
	11/20/2019	0.00121

Date	Count	Mean	Significant
2/27/2020	1	0.000796	FALSE

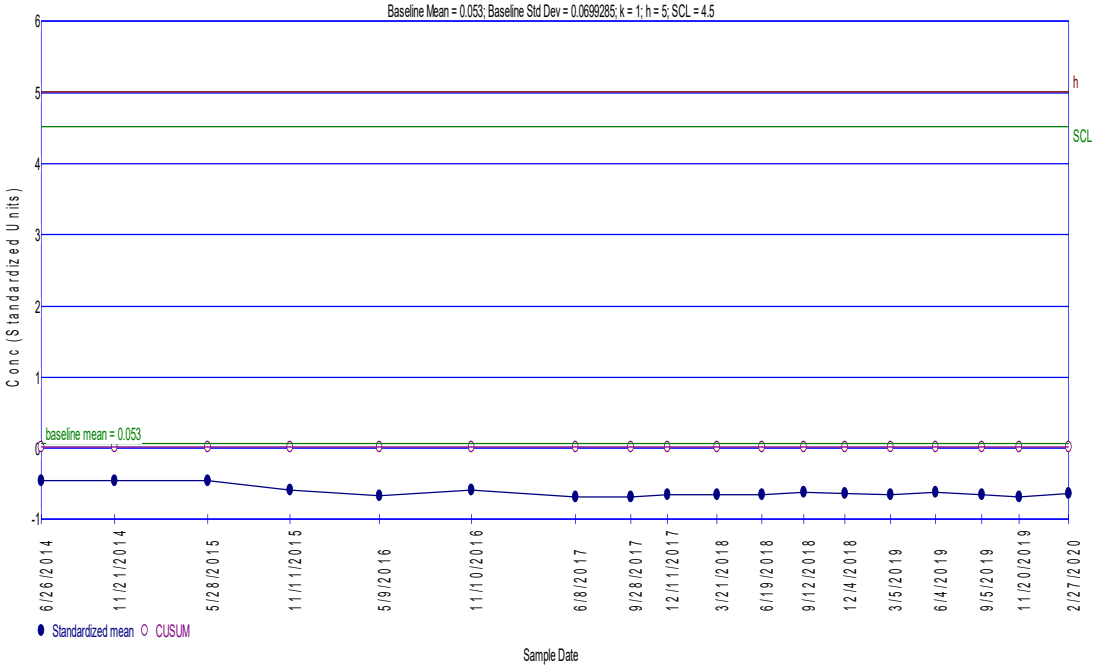
Barium



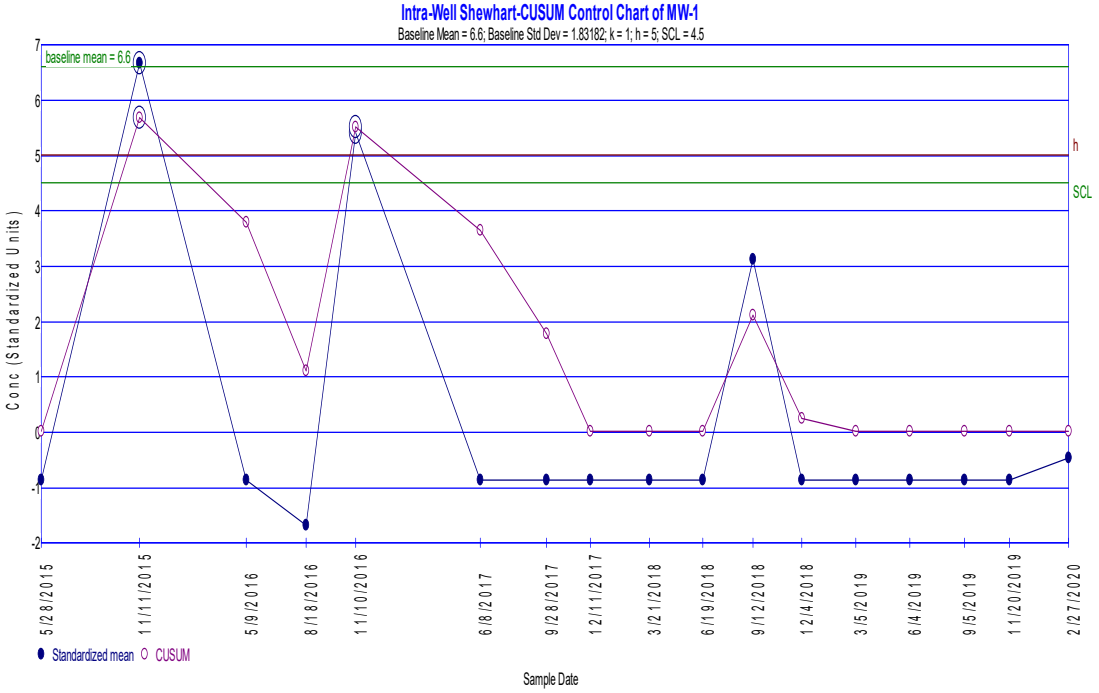
Chloride



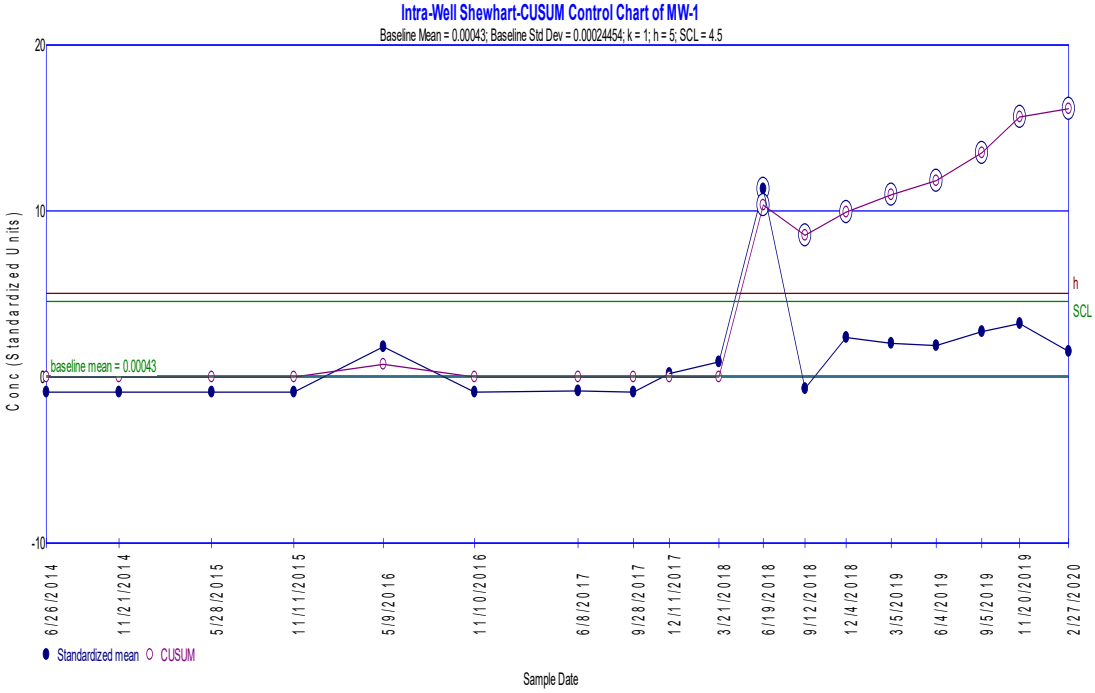
Nickel



Sulfate



Mercury


Intra-Well Shewhart-CUSUM Control Chart of MW-1
Baseline Mean = 0.00043; Baseline Std Dev = 0.00024454; k = 1; h = 5; SCL = 4.5
20
10
0
-10
Conc (Standardized Units)
baseline mean = 0.00043
h
SCL
6/26/2014
11/21/2014
5/28/2015
11/11/2015
5/9/2016
11/10/2016
6/8/2017
9/28/2017
12/11/2017
3/21/2018
6/19/2018
9/12/2018
12/4/2018
3/5/2019
6/4/2019
9/5/2019
11/20/2019
2/27/2020
Standardized mean
CUSUM
Sample Date

Shapiro-Francia Test of Normality

Parameter: Aluminum

All Locations

Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Number of Measurements = 127

Data Set Standard Deviation = 1.27249
Numerator = 7798.33
Denominator = 24454.2
W Statistic = 0.318895 = 7798.33 / 24454.2

5% Critical value of 0.976 exceeds 0.318895
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.318895
Evidence of non-normality at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Barium

All Locations

Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Number of Measurements = 128

Data Set Standard Deviation = 0.0906707
Numerator = 55.5407
Denominator = 126.04
W Statistic = 0.440661 = 55.5407 / 126.04

5% Critical value of 0.976 exceeds 0.440661
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.440661
Evidence of non-normality at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Total Cadmium

All Locations

Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Number of Measurements = 128

Data Set Standard Deviation = 0.0340734
Numerator = 2.84079
Denominator = 17.7993
W Statistic = 0.159601 = 2.84079 / 17.7993

5% Critical value of 0.976 exceeds 0.159601
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.159601
Evidence of non-normality at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Chloride

All Locations

Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Number of Measurements = 138

Data Set Standard Deviation = 63.3636
Numerator = 3.9592e+007
Denominator = 7.18207e+007
W Statistic = 0.551262 = 3.9592e+007 / 7.18207e+007

5% Critical value of 0.976 exceeds 0.551262
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.551262
Evidence of non-normality at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Chromium

All Locations

Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Number of Measurements = 127

Data Set Standard Deviation = 0.0150579
Numerator = 0.890964
Denominator = 3.42429
W Statistic = 0.26019 = 0.890964 / 3.42429

5% Critical value of 0.976 exceeds 0.26019
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.26019
Evidence of non-normality at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Cobalt

All Locations

Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Number of Measurements = 127

Data Set Standard Deviation = 0.015507
Numerator = 2.4565
Denominator = 3.63163
W Statistic = 0.676419 = 2.4565 / 3.63163

5% Critical value of 0.976 exceeds 0.676419
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.676419
Evidence of non-normality at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Fluoride

All Locations

Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Number of Measurements = 98

Data Set Standard Deviation = 0.0644132
Numerator = 12.2026
Denominator = 36.5178
W Statistic = 0.334155 = 12.2026 / 36.5178

5% Critical value of 0.976 exceeds 0.334155
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.334155
Evidence of non-normality at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Nickel

All Locations

Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Number of Measurements = 129

Data Set Standard Deviation = 0.0281896
Numerator = 4.81739
Denominator = 12.382
W Statistic = 0.389064 = 4.81739 / 12.382

5% Critical value of 0.976 exceeds 0.389064
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.389064
Evidence of non-normality at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Sulfate

All Locations

Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Number of Measurements = 129

Data Set Standard Deviation = 56.9274
Numerator = 1.37701e+007
Denominator = 5.04957e+007
W Statistic = 0.272698 = 1.37701e+007 / 5.04957e+007

5% Critical value of 0.976 exceeds 0.272698
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.272698
Evidence of non-normality at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Aluminum

All Locations

Normality Test of Parameter Concentrations

Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
Total Number of Measurements = 127

Data Set Standard Deviation = 1.26906
Numerator = 21683.8
Denominator = 24322.6
W Statistic = 0.891508 = 21683.8 / 24322.6

5% Critical value of 0.976 exceeds 0.891508
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.891508
Evidence of non-normality at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Barium

All Locations

Normality Test of Parameter Concentrations

Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
Total Number of Measurements = 128

Data Set Standard Deviation = 0.941584
Numerator = 13107
Denominator = 13592.3
W Statistic = 0.964301 = 13107 / 13592.3

5% Critical value of 0.976 exceeds 0.964301
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.964301
Evidence of non-normality at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Total Cadmium

All Locations

Normality Test of Parameter Concentrations

Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
Total Number of Measurements = 128

Data Set Standard Deviation = 1.52329
Numerator = 13646.4
Denominator = 35574.5
W Statistic = 0.383601 = 13646.4 / 35574.5

5% Critical value of 0.976 exceeds 0.383601
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.383601
Evidence of non-normality at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Chloride

All Locations

Normality Test of Parameter Concentrations

Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
Total Number of Measurements = 138

Data Set Standard Deviation = 1.34108
Numerator = 31591.2
Denominator = 32172.1
W Statistic = 0.981942 = 31591.2 / 32172.1

5% Critical value of 0.976 is less than 0.981942
Data is normally distributed at 95% level of significance

1% Critical value of 0.967 is less than 0.981942
Data is normally distributed at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Chromium

All Locations

Normality Test of Parameter Concentrations

Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
Total Number of Measurements = 127

Data Set Standard Deviation = 0.967175
Numerator = 10908.5
Denominator = 14127.1
W Statistic = 0.772166 = 10908.5 / 14127.1

5% Critical value of 0.976 exceeds 0.772166
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.772166
Evidence of non-normality at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Cobalt

All Locations

Normality Test of Parameter Concentrations

Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
Total Number of Measurements = 127

Data Set Standard Deviation = 1.4029
Numerator = 24706.6
Denominator = 29723.5
W Statistic = 0.831216 = 24706.6 / 29723.5

5% Critical value of 0.976 exceeds 0.831216
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.831216
Evidence of non-normality at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Fluoride

All Locations

Normality Test of Parameter Concentrations

Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
Total Number of Measurements = 98

Data Set Standard Deviation = 0.541072
Numerator = 1116.11
Denominator = 2576.7
W Statistic = 0.433154 = 1116.11 / 2576.7

5% Critical value of 0.976 exceeds 0.433154
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.433154
Evidence of non-normality at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Nickel

All Locations

Normality Test of Parameter Concentrations

Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
Total Number of Measurements = 129

Data Set Standard Deviation = 1.26866
Numerator = 21458.6
Denominator = 25078.6
W Statistic = 0.855652 = 21458.6 / 25078.6

5% Critical value of 0.976 exceeds 0.855652
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.855652
Evidence of non-normality at 99% level of significance

Shapiro-Francia Test of Normality

Parameter: Sulfate

All Locations

Normality Test of Parameter Concentrations

Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL
Total Number of Measurements = 129

Data Set Standard Deviation = 1.22253
Numerator = 15697.4
Denominator = 23288
W Statistic = 0.674054 = 15697.4 / 23288

5% Critical value of 0.976 exceeds 0.674054
Evidence of non-normality at 95% level of significance

1% Critical value of 0.967 exceeds 0.674054
Evidence of non-normality at 99% level of significance

Parametric Prediction Interval Analysis

Inter-Well Comparison

Parameter: Chloride

Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL

Inter-Well Unified Guid. Formula 95% One-Sided Comparison

Background Samples = 29
Background Mean = 0.944336
Background Std Dev = 0.336577

Number of comparisons = 6
Future Samples (k) = 6
Actual confidence level is 1.0 - (0.05/6) = 99.1667 %
t is Percentile of Student's T-Test (0.95/6) = 0.991667
Degrees of Freedom = 29 (background observations) - 1
t(0.991667, 29) = 2.56585

Well MW-3

Date	Samples	Mean	Interval	Significant
2/27/2020	1	2.8792	[0, 1.82271]	TRUE

Well MW-4

Date	Samples	Mean	Interval	Significant
2/27/2020	1	2.06306	[0, 1.82271]	TRUE

Well MW-5

Date	Samples	Mean	Interval	Significant
2/27/2020	1	4.38701	[0, 1.82271]	TRUE

Well TMW-1

Date	Samples	Mean	Interval	Significant
2/27/2020	1	2.98062	[0, 1.82271]	TRUE

Well TMW-2

Date	Samples	Mean	Interval	Significant
2/27/2020	1	3.46261	[0, 1.82271]	TRUE

Well TMW-3

Date	Samples	Mean	Interval	Significant
2/27/2020	1	4.12713	[0, 1.82271]	TRUE

Non-Parametric Prediction Interval

Inter-Well Comparison

Parameter: Total Cadmium

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 88.2813%
Number of comparisons = 6
Future Samples (k) = 6
Recent Dates = 1
Background Measurements (n) = 27
Maximum Background Value = 0.001
Confidence Level = 81.8%
False Positive Rate = 18.2%

Location	Date	Count	Mean	Significant
MW-3	**2/27/2020**	**1**	**0.00212**	**TRUE**
MW-4	2/27/2020	1	0.001	FALSE
MW-5	2/27/2020	1	0.001	FALSE
TMW-1	2/27/2020	1	0.001	FALSE
TMW-2	2/27/2020	1	0.001	FALSE
TMW-3	2/27/2020	1	0.001	FALSE

Non-Parametric Prediction Interval

Inter-Well Comparison

Parameter: Chromium

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 73.2283%
Number of comparisons = 6
Future Samples (k) = 6
Recent Dates = 1
Background Measurements (n) = 28
Maximum Background Value = 0.12
Confidence Level = 82.4%
False Positive Rate = 17.6%

Location	Date	Count	Mean	Significant
MW-3	2/27/2020	1	0.002	FALSE
MW-4	2/27/2020	1	0.002	FALSE
MW-5	2/27/2020	1	0.00564	FALSE
TMW-1	2/27/2020	1	0.00244	FALSE
TMW-2	2/27/2020	1	0.002	FALSE
TMW-3	2/27/2020	1	0.00234	FALSE

Non-Parametric Prediction Interval

Inter-Well Comparison

Parameter: Cobalt

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 59.0551%
Number of comparisons = 6
Future Samples (k) = 6
Recent Dates = 1
Background Measurements (n) = 28
Maximum Background Value = 0.0763
Confidence Level = 82.4%
False Positive Rate = 17.6%

Location	Date	Count	Mean	Significant
MW-3	2/27/2020	1	0.002	FALSE
MW-4	2/27/2020	1	0.002	FALSE
MW-5	2/27/2020	1	0.00234	FALSE
TMW-1	2/27/2020	1	0.002	FALSE
TMW-2	2/27/2020	1	0.002	FALSE
TMW-3	2/27/2020	1	0.002	FALSE

Non-Parametric Prediction Interval

Inter-Well Comparison

Parameter: Fluoride

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 85.7143%
Number of comparisons = 6
Future Samples (k) = 6
Recent Dates = 1
Background Measurements (n) = 18
Maximum Background Value = 0.178
Confidence Level = 75%
False Positive Rate = 25%

Location	Date	Count	Mean	Significant
MW-3	2/27/2020	1	0.161	FALSE
MW-4	2/27/2020	1	0.1	FALSE
MW-5	2/27/2020	1	0.1	FALSE
TMW-1	2/27/2020	1	0.1	FALSE
TMW-2	2/27/2020	1	0.1	FALSE
TMW-3	2/27/2020	1	0.1	FALSE

Non-Parametric Prediction Interval

Inter-Well Comparison

Parameter: Nickel

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 60.4651%
Number of comparisons = 6
Future Samples (k) = 6
Recent Dates = 1
Background Measurements (n) = 28
Maximum Background Value = 0.2
Confidence Level = 82.4%
False Positive Rate = 17.6%

Location	Date	Count	Mean	Significant
MW-3	2/27/2020	1	0.00324	FALSE
MW-4	2/27/2020	1	0.002	FALSE
MW-5	2/27/2020	1	0.00651	FALSE
TMW-1	2/27/2020	1	0.002	FALSE
TMW-2	2/27/2020	1	0.002	FALSE
TMW-3	2/27/2020	1	0.002	FALSE

Non-Parametric Prediction Interval

Inter-Well Comparison

Parameter: Sulfate

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

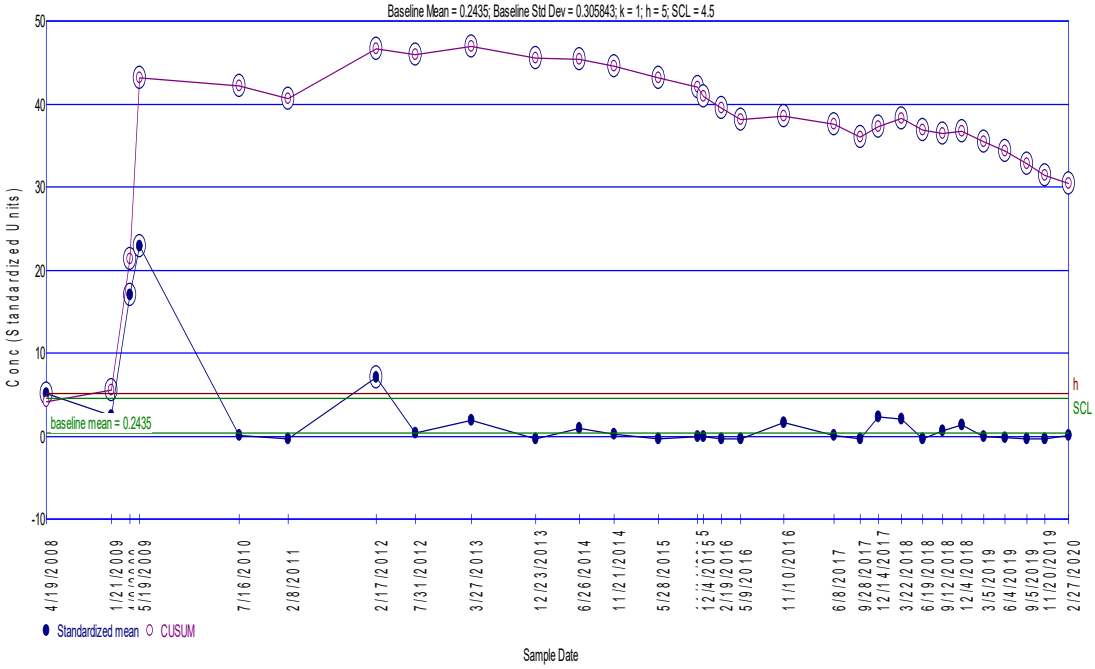
Total Percent Non-Detects = 63.5659%
Number of comparisons = 6
Future Samples (k) = 6
Recent Dates = 1
Background Measurements (n) = 27
Maximum Background Value = 18.8
Confidence Level = 81.8%
False Positive Rate = 18.2%

Location	Date	Count	Mean	Significant
MW-3	**2/27/2020**	**1**	**62**	**TRUE**
MW-4	2/27/2020	1	5	FALSE
MW-5	2/27/2020	1	9.5	FALSE
TMW-1	2/27/2020	1	5	FALSE
TMW-2	2/27/2020	1	5	FALSE
TMW-3	2/27/2020	1	5	FALSE

Aluminum

Inter-Well Shewhart-CUSUM Control Chart of MW-3

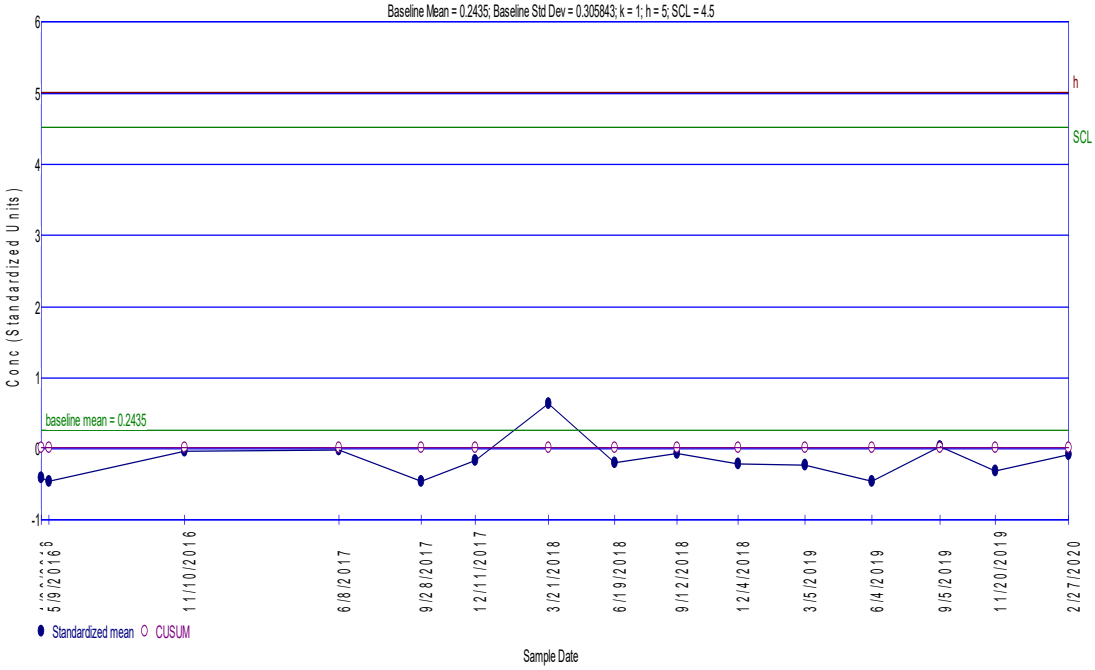
Baseline Mean = 0.2435; Baseline Std Dev = 0.305843; k = 1; h = 5; SCL = 4.5



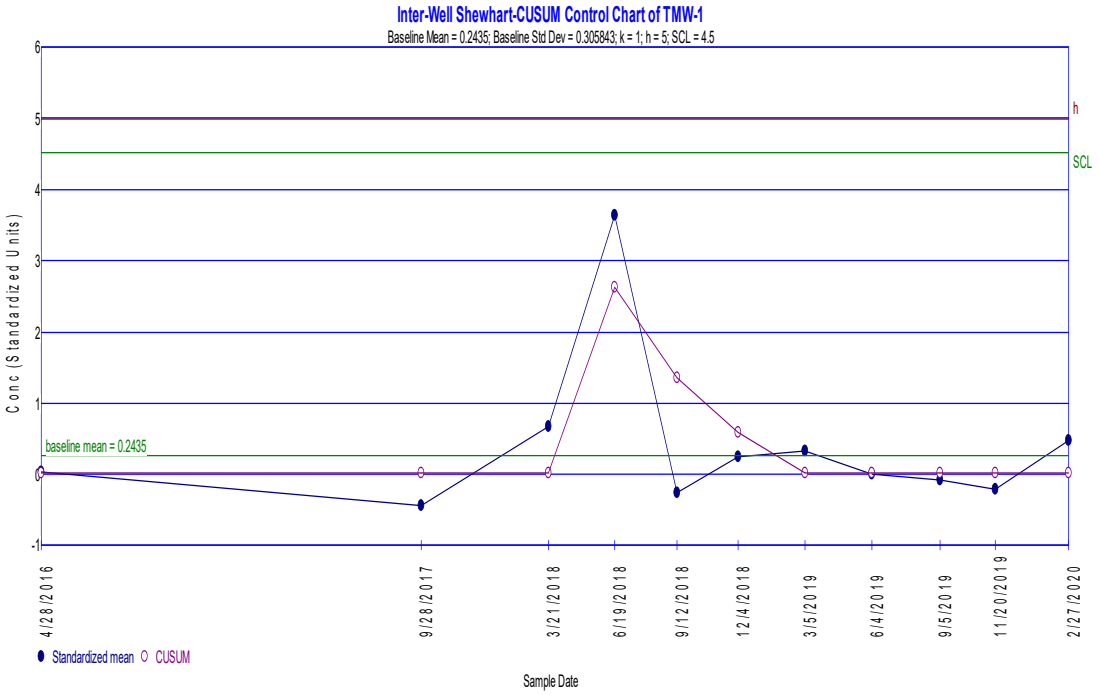
Aluminum

Inter-Well Shewhart-CUSUM Control Chart of MW-5

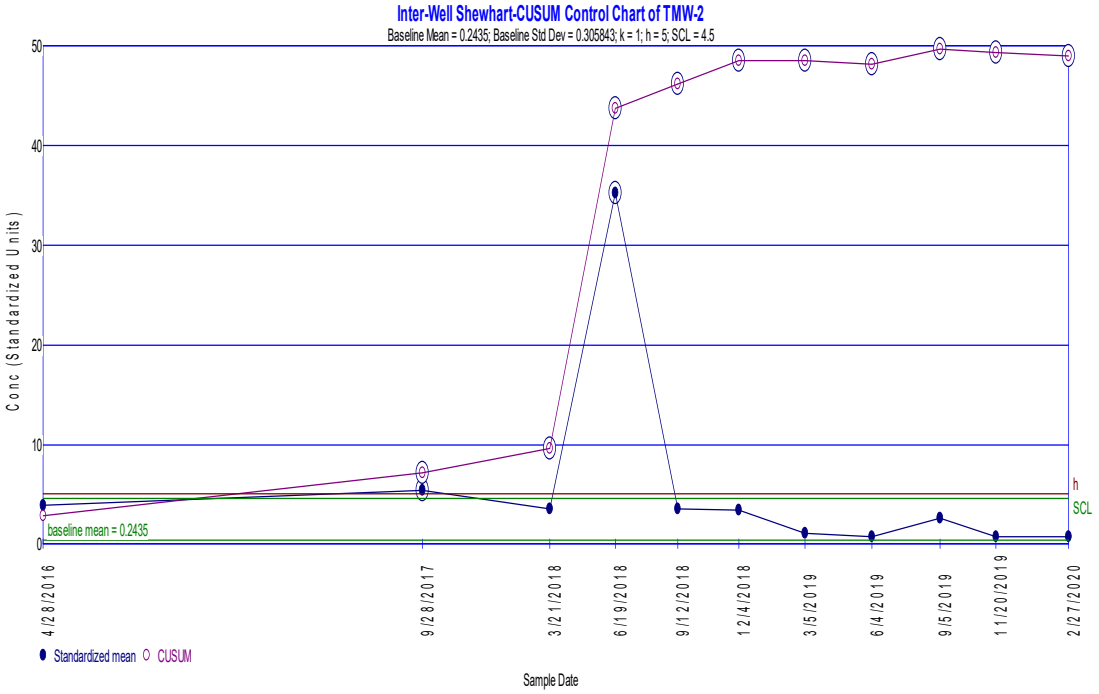
Baseline Mean = 0.2435; Baseline Std Dev = 0.305843; k = 1; h = 5; SCL = 4.5



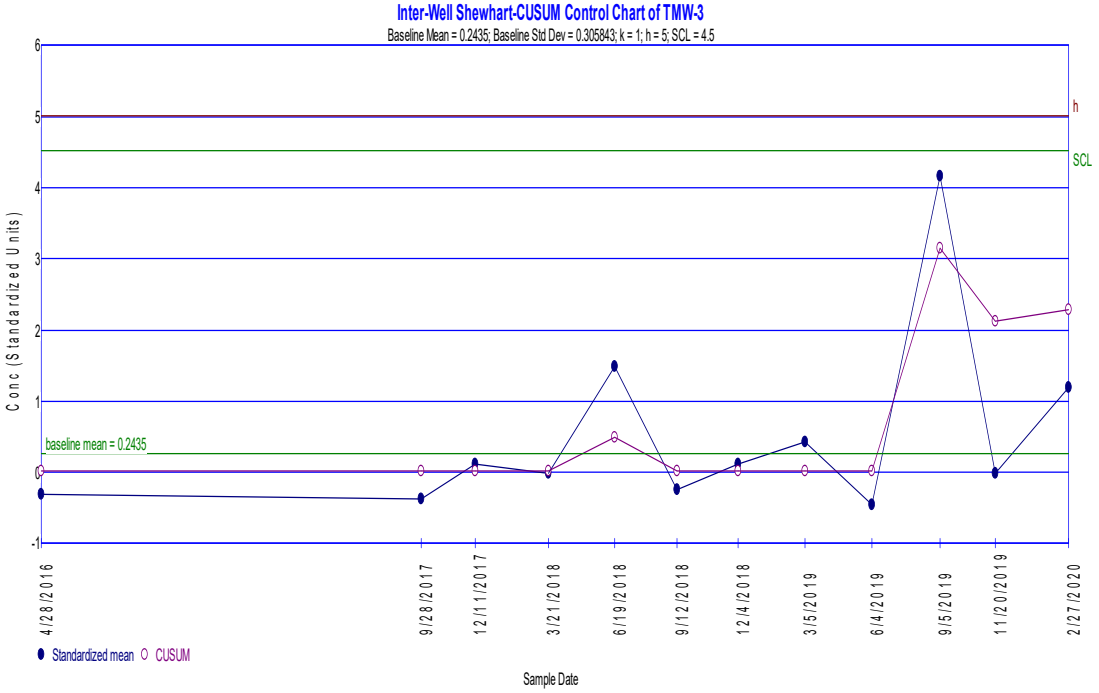
Aluminum



Aluminum



Aluminum


Inter-Well Shewhart-CUSUM Control Chart of TMW-3
Baseline Mean = 0.2435; Baseline Std Dev = 0.305843; k = 1; h = 5; SCL = 4.5
h
SCL
baseline mean = 0.2435
Conc (Standardized Units)
6
5
4
3
2
1
0
-1
4/28/2016
9/28/2017
12/11/2017
3/21/2018
6/19/2018
9/12/2018
12/4/2018
3/5/2019
6/4/2019
9/5/2019
11/20/2019
2/27/2020
Standardized mean
CUSUM
Sample Date

Wilcoxon Non-Parametric Analysis (Inter-Well)

Parameter: Total Cadmium

Location: MW-3

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total non detects is 43
Non detect rank is 22

Wilcoxon Ranks

Location	Date	Conc.	Rank
MW-1	4/19/2008	ND<0.001	22
	1/21/2009	ND<0.001	22
	4/9/2009	ND<0.001	22
	5/19/2009	ND<0.001	22
	7/16/2010	ND<0.001	22
	2/8/2011	ND<0.001	22
	2/17/2012	ND<0.001	22
	7/31/2012	ND<0.001	22
	12/23/2013	ND<0.001	22
	6/26/2014	ND<0.001	22
	11/21/2014	ND<0.001	22
	5/28/2015	ND<0.001	22
	11/11/2015	ND<0.001	22
	5/9/2016	ND<0.001	22
	11/10/2016	ND<0.001	22
	6/8/2017	ND<0.001	22
	9/28/2017	ND<0.001	22
	12/11/2017	ND<0.001	22
	3/21/2018	ND<0.001	22
	6/19/2018	ND<0.001	22
	9/12/2018	ND<0.001	22
	12/4/2018	ND<0.001	22
	3/5/2019	ND<0.001	22
	6/4/2019	ND<0.001	22
	9/5/2019	ND<0.001	22
	11/20/2019	ND<0.001	22
	2/27/2020	ND<0.001	22
MW-3	4/19/2008	ND<0.001	22
	1/21/2009	ND<0.001	22
	4/9/2009	ND<0.001	22
	5/19/2009	ND<0.001	22
	7/16/2010	ND<0.001	22
	2/8/2011	ND<0.001	22
	2/17/2012	ND<0.001	22
	7/31/2012	ND<0.001	22
	12/23/2013	ND<0.001	22
	6/26/2014	ND<0.001	22
	11/21/2014	ND<0.001	22
	5/28/2015	ND<0.001	22
	11/11/2015	ND<0.001	22
	12/4/2015	ND<0.001	22
	2/19/2016	ND<0.001	22
	5/9/2016	ND<0.001	22
	11/10/2016	0.00177	45
	6/8/2017	0.0286	53

8/8/2017	0.0113	51
9/28/2017	0.00926	50
12/14/2017	0.00659	47
3/22/2018	0.00671	48
6/19/2018	0.0312	55
9/12/2018	0.297	58
9/27/2018	0.204	57
12/4/2018	0.144	56
3/5/2019	0.0117	52
6/4/2019	0.0292	54
9/5/2019	0.0088	49
11/20/2019	0.00157	44
2/27/2020	0.00212	46

The Wilcoxon Statistic is 621
The Expected value is is 418.5
The Standard Deviation is 64.1502
The Z Score is 3.14886
The Standard Deviation adjusted for ties is 49.3834
The Z Score adjusted for ties is 4.09044
3.14886 > 2.326 indicating statistical significance at 1% level
4.09044 > 2.326 indicating statistical significance at 1% level when adjusted for ties

Wilcoxon Non-Parametric Analysis (Inter-Well)

Parameter: Sulfate

Location: MW-3

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total non detects is 17
Non detect rank is 9

Wilcoxon Ranks

Location	Date	Conc.	Rank
MW-1	5/19/2009	8.9	25
	7/16/2010	9.4	28
	2/8/2011	5.8	22
	9/14/2011	6.6	24
	2/17/2012	ND<5	9
	7/31/2012	ND<5	9
	3/27/2013	5.1	19
	12/23/2013	6.1	23
	6/26/2014	ND<5	9
	11/21/2014	9.1	27
	5/28/2015	ND<5	9
	11/11/2015	18.8	35
	5/9/2016	ND<5	9
	8/18/2016	3.51	18
	11/10/2016	16.5	34
	6/8/2017	ND<5	9
	9/28/2017	ND<5	9
	12/11/2017	ND<5	9
	3/21/2018	ND<5	9
	6/19/2018	ND<5	9
	9/12/2018	12.3	32
	12/4/2018	ND<5	9
	3/5/2019	ND<5	9
	6/4/2019	ND<5	9
	9/5/2019	ND<5	9
	11/20/2019	ND<5	9
	2/27/2020	5.72	21
MW-3	5/19/2009	ND<5	9
	7/16/2010	5.1	20
	2/8/2011	ND<5	9
	2/17/2012	22	36
	7/31/2012	23	40
	3/27/2013	16	33
	12/23/2013	12	31
	6/26/2014	9.7	29
	11/21/2014	11	30
	5/28/2015	9.09	26
	11/11/2015	29.3	42
	12/4/2015	29.1	41
	2/19/2016	22.2	37
	5/9/2016	22.3	38
	8/18/2016	95.7	50
	11/10/2016	34	44
	6/8/2017	93.7	49
	9/28/2017	46.2	45

12/14/2017	46.2	46
3/22/2018	22.3	39
6/19/2018	30.1	43
9/12/2018	484	55
12/4/2018	324	54
3/5/2019	85.8	48
6/4/2019	219	53
9/5/2019	154	52
11/20/2019	111	51
2/27/2020	62	47

The Wilcoxon Statistic is 691
The Expected value is is 378
The Standard Deviation is 59.397
The Z Score is 5.26121
The Standard Deviation adjusted for ties is 58.5162
The Z Score adjusted for ties is 5.3404
5.26121 > 2.326 indicating statistical significance at 1% level
5.3404 > 2.326 indicating statistical significance at 1% level when adjusted for ties

Mann-Kendall Trend Analysis

Parameter: Aluminum

Location: MW-3

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 136 - 288 = -152

Tied Grou	Value	Members
1	0.1	5
2	0.2	2

Time Period	Observations
4/19/2008	1
1/21/2009	1
4/9/2009	1
5/19/2009	1
7/16/2010	1
2/8/2011	1
2/17/2012	1
7/31/2012	1
3/27/2013	1
12/23/2013	1
6/26/2014	1
11/21/2014	1
5/28/2015	1
11/11/2015	1
12/4/2015	1
2/19/2016	1
5/9/2016	1
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/14/2017	1
3/22/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1
9/5/2019	1
11/20/2019	1
2/27/2020	1

There are 0 time periods with multiple data

A = 318
B = 0
C = 60
D = 0
E = 22
F = 0
a = 56550
b = 219240
c = 1740
Group Variance = 3124

Z-Score = -2.7016
Comparison Level at 95% confidence level = -1.65463 (downward trend)
-2.7016 < -1.65463 indicating a downward trend

Mann-Kendall Trend Analysis

Parameter: Aluminum

Location: MW-5

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 52 - 50 = 2

Tied Grou	Value	Members
1	0.1	3

Time Period	Observations
4/28/2016	1
5/9/2016	1
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/11/2017	1
3/21/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1
9/5/2019	1
11/20/2019	1
2/27/2020	1

There are 0 time periods with multiple data

A = 66
B = 0
C = 6
D = 0
E = 6
F = 0
a = 7350
b = 24570
c = 420
Group Variance = 404.667
Z-Score = 0.0497109
Comparison Level at 1.0 - (0.05 / 2) = 97.5% confidence level = 1.97737 (two-tailed)
|0.0497109| <= 1.97737 indicating no evidence of a trend

Mann-Kendall Trend Analysis

Parameter: Aluminum

Location: TMW-1

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 27 - 28 = -1

Tied Grou	Value	Members

Time Period	Observations
4/28/2016	1
9/28/2017	1
3/21/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1
9/5/2019	1
11/20/2019	1
2/27/2020	1

There are 0 time periods with multiple data

A = 0
B = 0
C = 0
D = 0
E = 0
F = 0
a = 2970
b = 8910
c = 220
Group Variance = 165
Z-Score = 0
Comparison Level at 1.0 - (0.05 / 2) = 97.5% confidence level = 1.97737 (two-tailed)
|0| <= 1.97737 indicating no evidence of a trend

Mann-Kendall Trend Analysis

Parameter: Aluminum

Location: TMW-2

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 9 - 46 = -37

Tied GrouValue	Members

Time Period	Observations
4/28/2016	1
9/28/2017	1
3/21/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1
9/5/2019	1
11/20/2019	1
2/27/2020	1

There are 0 time periods with multiple data

A = 0
B = 0
C = 0
D = 0
E = 0
F = 0
a = 2970
b = 8910
c = 220
Group Variance = 165
Z-Score = -2.8026
Comparison Level at 95% confidence level = -1.65463 (downward trend)
-2.8026 < -1.65463 indicating a downward trend

Mann-Kendall Trend Analysis

Parameter: Aluminum

Location: TMW-3

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 43 - 23 = 20

Tied GrouValue	Members

Time Period	Observations
4/28/2016	1
9/28/2017	1
12/11/2017	1
3/21/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1
9/5/2019	1
11/20/2019	1
2/27/2020	1

There are 0 time periods with multiple data

A = 0
B = 0
C = 0
D = 0
E = 0
F = 0
a = 3828
b = 11880
c = 264
Group Variance = 212.667
Z-Score = 1.30288
Comparison Level at 1.0 - (0.05 / 2) = 97.5% confidence level = 1.97737 (two-tailed)
|1.30288| <= 1.97737 indicating no evidence of a trend

Mann-Kendall Trend Analysis

Parameter: Barium

Location: MW-3

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 230 - 235 = -5

Tied GrouValue	Members

Time Period	Observations
4/19/2008	1
1/21/2009	1
4/9/2009	1
5/19/2009	1
7/16/2010	1
2/8/2011	1
2/17/2012	1
7/31/2012	1
3/27/2013	1
12/23/2013	1
6/26/2014	1
11/21/2014	1
5/28/2015	1
11/11/2015	1
12/4/2015	1
2/19/2016	1
5/9/2016	1
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/14/2017	1
3/22/2018	1
6/19/2018	1
9/12/2018	1
9/27/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1
9/5/2019	1
11/20/2019	1
2/27/2020	1

There are 0 time periods with multiple data

A = 0
B = 0
C = 0
D = 0
E = 0
F = 0
a = 62310
b = 242730
c = 1860
Group Variance = 3461.67
Z-Score = -0.0679857

Comparison Level at 1.0 - (0.05 / 2) = 97.5% confidence level = 1.97737 (two-tailed)
|-0.0679857| <= 1.97737 indicating no evidence of a trend

Mann-Kendall Trend Analysis

Parameter: Barium

Location: MW-4

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 53 - 137 = -84

Tied GrouValue	Members

Time Period	Observations
3/27/2013	1
12/23/2013	1
6/26/2014	1
11/21/2014	1
5/28/2015	1
11/11/2015	1
5/9/2016	1
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/11/2017	1
3/22/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1
9/5/2019	1
11/20/2019	1
2/27/2020	1

There are 0 time periods with multiple data

A = 0
B = 0
C = 0
D = 0
E = 0
F = 0
a = 17100
b = 61560
c = 760
Group Variance = 950
Z-Score = -2.69288
Comparison Level at 95% confidence level = -1.65463 (downward trend)
-2.69288 < -1.65463 indicating a downward trend

Mann-Kendall Trend Analysis

Parameter: Barium

Location: MW-5

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 91 - 14 = 77

Tied GrouValue	Members

Time Period	Observations
4/28/2016	1
5/9/2016	1
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/11/2017	1
3/21/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1
9/5/2019	1
11/20/2019	1
2/27/2020	1

There are 0 time periods with multiple data

A = 0
B = 0
C = 0
D = 0
E = 0
F = 0
a = 7350
b = 24570
c = 420
Group Variance = 408.333
Z-Score = 3.76102
Comparison Level at 95% confidence level = 1.65463 (upward trend)
3.76102 > 1.65463 indicating an upward trend

Mann-Kendall Trend Analysis

Parameter: Barium

Location: TMW-1

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 26 - 29 = -3

Tied GrouValue	Members

Time Period	Observations
4/28/2016	1
9/28/2017	1
3/21/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1
9/5/2019	1
11/20/2019	1
2/27/2020	1

There are 0 time periods with multiple data

A = 0
B = 0
C = 0
D = 0
E = 0
F = 0
a = 2970
b = 8910
c = 220
Group Variance = 165
Z-Score = -0.1557
Comparison Level at 1.0 - (0.05 / 2) = 97.5% confidence level = 1.97737 (two-tailed)
|-0.1557| <= 1.97737 indicating no evidence of a trend

Mann-Kendall Trend Analysis

Parameter: Barium

Location: TMW-2

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 18 - 37 = -19

Tied GrouValue	Members

Time Period	Observations
4/28/2016	1
9/28/2017	1
3/21/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1
9/5/2019	1
11/20/2019	1
2/27/2020	1

There are 0 time periods with multiple data

A = 0
B = 0
C = 0
D = 0
E = 0
F = 0
a = 2970
b = 8910
c = 220
Group Variance = 165
Z-Score = -1.4013
Comparison Level at 1.0 - (0.05 / 2) = 97.5% confidence level = 1.97737 (two-tailed)
|-1.4013| <= 1.97737 indicating no evidence of a trend

Mann-Kendall Trend Analysis

Parameter: Barium

Location: TMW-3

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 50 - 16 = 34

Tied GrouValue	Members

Time Period	Observations
4/28/2016	1
9/28/2017	1
12/11/2017	1
3/21/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1
9/5/2019	1
11/20/2019	1
2/27/2020	1

There are 0 time periods with multiple data

A = 0
B = 0
C = 0
D = 0
E = 0
F = 0
a = 3828
b = 11880
c = 264
Group Variance = 212.667
Z-Score = 2.26289
Comparison Level at 95% confidence level = 1.65463 (upward trend)
2.26289 > 1.65463 indicating an upward trend

Mann-Kendall Trend Analysis

Parameter: Total Cadmium

Location: MW-3

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 290 - 55 = 235

Tied GrouValue	Members
1 0.001	16

Time Period	Observations
4/19/2008	1
1/21/2009	1
4/9/2009	1
5/19/2009	1
7/16/2010	1
2/8/2011	1
2/17/2012	1
7/31/2012	1
12/23/2013	1
6/26/2014	1
11/21/2014	1
5/28/2015	1
11/11/2015	1
12/4/2015	1
2/19/2016	1
5/9/2016	1
11/10/2016	1
6/8/2017	1
8/8/2017	1
9/28/2017	1
12/14/2017	1
3/22/2018	1
6/19/2018	1
9/12/2018	1
9/27/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1
9/5/2019	1
11/20/2019	1
2/27/2020	1

There are 0 time periods with multiple data

A = 8880
B = 0
C = 3360
D = 0
E = 240
F = 0
a = 62310
b = 242730
c = 1860
Group Variance = 2968.33

Z-Score = 4.29496
Comparison Level at 95% confidence level = 1.65463 (upward trend)
4.29496 > 1.65463 indicating an upward trend

Mann-Kendall Trend Analysis

Parameter: Total Cadmium

Location: MW-3

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 50 - 55 = -5

Tied GrouValue	Members

Time Period	Observations
11/10/2016	1
6/8/2017	1
8/8/2017	1
9/28/2017	1
12/14/2017	1
3/22/2018	1
6/19/2018	1
9/12/2018	1
9/27/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1
9/5/2019	1
11/20/2019	1
2/27/2020	1

There are 0 time periods with multiple data

A = 0
B = 0
C = 0
D = 0
E = 0
F = 0
a = 7350
b = 24570
c = 420
Group Variance = 408.333
Z-Score = -0.197949
Comparison Level at 1.0 - (0.05 / 2) = 97.5% confidence level = 1.97737 (two-tailed)
|-0.197949| <= 1.97737 indicating no evidence of a trend

Mann-Kendall Trend Analysis

Parameter: Chloride

Location: MW-3

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 275 - 186 = 89

Tied GrouValue		Members
1	25	3
2	65	2

Time Period	Observations
4/19/2008	1
1/21/2009	1
4/9/2009	1
5/19/2009	1
7/16/2010	1
2/8/2011	1
2/17/2012	1
8/1/2012	1
3/27/2013	1
12/23/2013	1
6/26/2014	1
11/21/2014	1
5/28/2015	1
11/11/2015	1
12/4/2015	1
2/19/2016	1
5/9/2016	1
8/18/2016	1
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/14/2017	1
3/22/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1
9/5/2019	1
11/20/2019	1
2/27/2020	1

There are 0 time periods with multiple data

A = 84
B = 0
C = 6
D = 0
E = 8
F = 0
a = 62310
b = 242730
c = 1860

Group Variance = 3457
Z-Score = 1.49669
Comparison Level at 1.0 - (0.05 / 2) = 97.5% confidence level = 1.97737 (two-tailed)
|1.49669| <= 1.97737 indicating no evidence of a trend

Mann-Kendall Trend Analysis

Parameter: Chloride

Location: MW-4

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 105 - 105 = 0

Tied GrouValue	Members

Time Period	Observations
3/27/2013	1
4/11/2013	1
12/23/2013	1
6/26/2014	1
11/21/2014	1
5/28/2015	1
11/11/2015	1
5/9/2016	1
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/11/2017	1
3/22/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1
9/5/2019	1
11/20/2019	1
2/27/2020	1

There are 0 time periods with multiple data

A = 0
B = 0
C = 0
D = 0
E = 0
F = 0
a = 19740
b = 71820
c = 840
Group Variance = 1096.67
Z-Score = 0
Comparison Level at 1.0 - (0.05 / 2) = 97.5% confidence level = 1.97737 (two-tailed)
|0| <= 1.97737 indicating no evidence of a trend

Mann-Kendall Trend Analysis

Parameter: Chloride

Location: MW-5

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 96 - 8 = 88

Tied GrouValue		Members
1	83.5	2

Time Period	Observations
4/28/2016	1
5/9/2016	1
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/11/2017	1
3/21/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1
9/5/2019	1
11/20/2019	1
2/27/2020	1

There are 0 time periods with multiple data

A = 18
B = 0
C = 0
D = 0
E = 2
F = 0
a = 7350
b = 24570
c = 420
Group Variance = 407.333
Z-Score = 4.31067
Comparison Level at 95% confidence level = 1.65463 (upward trend)
4.31067 > 1.65463 indicating an upward trend

Mann-Kendall Trend Analysis

Parameter: Chloride
Location: TMW-1

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 89 - 2 = 87

Tied GrouValue	Members

Time Period	Observations
4/28/2016	1
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/11/2017	1
3/21/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1
9/5/2019	1
11/20/2019	1
2/27/2020	1

There are 0 time periods with multiple data

A = 0
B = 0
C = 0
D = 0
E = 0
F = 0
a = 6006
b = 19656
c = 364
Group Variance = 333.667
Z-Score = 4.70806
Comparison Level at 95% confidence level = 1.65463 (upward trend)
4.70806 > 1.65463 indicating an upward trend

Mann-Kendall Trend Analysis

Parameter: Chloride
Location: TMW-2

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 72 - 19 = 53

Tied GrouValue	Members

Time Period	Observations
4/28/2016	1
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/11/2017	1
3/21/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1
9/5/2019	1
11/20/2019	1
2/27/2020	1

There are 0 time periods with multiple data

A = 0
B = 0
C = 0
D = 0
E = 0
F = 0
a = 6006
b = 19656
c = 364
Group Variance = 333.667
Z-Score = 2.84673
Comparison Level at 95% confidence level = 1.65463 (upward trend)
2.84673 > 1.65463 indicating an upward trend

Mann-Kendall Trend Analysis

Parameter: Chloride
Location: TMW-3

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 81 - 10 = 71

Tied GrouValue	Members

Time Period	Observations
4/28/2016	1
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/11/2017	1
3/21/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1
9/5/2019	1
11/20/2019	1
2/27/2020	1

There are 0 time periods with multiple data

A = 0
B = 0
C = 0
D = 0
E = 0
F = 0
a = 6006
b = 19656
c = 364
Group Variance = 333.667
Z-Score = 3.83214
Comparison Level at 95% confidence level = 1.65463 (upward trend)
3.83214 > 1.65463 indicating an upward trend

Mann-Kendall Trend Analysis

Parameter: Chromium
Location: MW-5

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 69 - 21 = 48

Tied GrouValue		Members
1	0.002	6

Time Period	Observations
4/28/2016	1
5/9/2016	1
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/11/2017	1
3/21/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1
9/5/2019	1
11/20/2019	1
2/27/2020	1

There are 0 time periods with multiple data

A = 510
B = 0
C = 120
D = 0
E = 30
F = 0
a = 7350
b = 24570
c = 420
Group Variance = 380
Z-Score = 2.41105
Comparison Level at 95% confidence level = 1.65463 (upward trend)
2.41105 > 1.65463 indicating an upward trend

Mann-Kendall Trend Analysis

Parameter: Chromium
Location: TMW-1

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 20 - 14 = 6

Tied GrouValue		Members
1	0.002	7

Time Period	Observations
4/28/2016	1
9/28/2017	1
3/21/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1
9/5/2019	1
11/20/2019	1
2/27/2020	1

There are 0 time periods with multiple data

A = 798
B = 0
C = 210
D = 0
E = 42
F = 0
a = 2970
b = 8910
c = 220
Group Variance = 120.667
Z-Score = 0.455173
Comparison Level at 1.0 - (0.05 / 2) = 97.5% confidence level = 1.97737 (two-tailed)
|0.455173| <= 1.97737 indicating no evidence of a trend

Mann-Kendall Trend Analysis

Parameter: Chromium
Location: TMW-3

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 34 - 11 = 23

Tied GrouValue		Members
1	0.002	7

Time Period	Observations
4/28/2016	1
9/28/2017	1
12/11/2017	1
3/21/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1
9/5/2019	1
11/20/2019	1
2/27/2020	1

There are 0 time periods with multiple data

A = 798
B = 0
C = 210
D = 0
E = 42
F = 0
a = 3828
b = 11880
c = 264
Group Variance = 168.333
Z-Score = 1.69566
Comparison Level at 1.0 - (0.05 / 2) = 97.5% confidence level = 1.97737 (two-tailed)
|1.69566| <= 1.97737 indicating no evidence of a trend

Mann-Kendall Trend Analysis

Parameter: Cobalt
Location: MW-5

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 55 - 49 = 6

Tied GrouValue		Members
1	0.00264	2

Time Period	Observations
4/28/2016	1
5/9/2016	1
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/11/2017	1
3/21/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1
9/5/2019	1
11/20/2019	1
2/27/2020	1

There are 0 time periods with multiple data

A = 18
B = 0
C = 0
D = 0
E = 2
F = 0
a = 7350
b = 24570
c = 420
Group Variance = 407.333
Z-Score = 0.247739
Comparison Level at 1.0 - (0.05 / 2) = 97.5% confidence level = 1.97737 (two-tailed)
|0.247739| <= 1.97737 indicating no evidence of a trend

Mann-Kendall Trend Analysis

Parameter: Fluoride
Location: MW-3

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 94 - 36 = 58

Tied GrouValue		Members
1	0.1	4

Time Period	Observations
1/21/2009	1
4/9/2009	1
5/19/2009	1
5/9/2016	1
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/14/2017	1
3/22/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1
9/5/2019	1
11/20/2019	1
2/27/2020	1

There are 0 time periods with multiple data

A = 156
B = 0
C = 24
D = 0
E = 12
F = 0
a = 10608
b = 36720
c = 544
Group Variance = 580.667
Z-Score = 2.36544
Comparison Level at 95% confidence level = 1.65463 (upward trend)
2.36544 > 1.65463 indicating an upward trend

Mann-Kendall Trend Analysis

Parameter: Nickel

Location: MW-3

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 140 - 250 = -110

Tied Group	Value	Members
1	0.02	12
2	0.01	3
3	0.002	4

Time Period	Observations
4/19/2008	1
1/21/2009	1
4/9/2009	1
5/19/2009	1
7/16/2010	1
2/8/2011	1
2/17/2012	1
7/31/2012	1
3/27/2013	1
12/23/2013	1
6/26/2014	1
11/21/2014	1
5/28/2015	1
11/11/2015	1
12/4/2015	1
2/19/2016	1
5/9/2016	1
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/14/2017	1
3/22/2018	1
6/19/2018	1
9/12/2018	1
9/27/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1
9/5/2019	1
11/20/2019	1
2/27/2020	1

There are 0 time periods with multiple data

A = 4050
B = 0
C = 1350
D = 0
E = 150
F = 0
a = 62310
b = 242730

c = 1860
Group Variance = 3236.67
Z-Score = -1.91592
Comparison Level at 95% confidence level = -1.65463 (downward trend)
-1.91592 < -1.65463 indicating a downward trend

Mann-Kendall Trend Analysis

Parameter: Nickel

Location: MW-5

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 68 - 37 = 31

Tied Group	Value	Members

Time Period	Observations
4/28/2016	1
5/9/2016	1
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/11/2017	1
3/21/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1
9/5/2019	1
11/20/2019	1
2/27/2020	1

There are 0 time periods with multiple data

A = 0
B = 0
C = 0
D = 0
E = 0
F = 0
a = 7350
b = 24570
c = 420
Group Variance = 408.333
Z-Score = 1.48461
Comparison Level at 1.0 - (0.05 / 2) = 97.5% confidence level = 1.97737 (two-tailed)
|1.48461| <= 1.97737 indicating no evidence of a trend

Mann-Kendall Trend Analysis

Parameter: Sulfate

Location: MW-3

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 307 - 68 = 239

Tied Group	Value	Members
1	5	2
2	22.3	2
3	46.2	2

Time Period	Observations
5/19/2009	1
7/16/2010	1
2/8/2011	1
2/17/2012	1
7/31/2012	1
3/27/2013	1
12/23/2013	1
6/26/2014	1
11/21/2014	1
5/28/2015	1
11/11/2015	1
12/4/2015	1
2/19/2016	1
5/9/2016	1
8/18/2016	1
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/14/2017	1
3/22/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1
9/5/2019	1
11/20/2019	1
2/27/2020	1

There are 0 time periods with multiple data

A = 54
B = 0
C = 0
D = 0
E = 6
F = 0
a = 46116
b = 176904
c = 1512
Group Variance = 2559
Z-Score = 4.70481

Comparison Level at 95% confidence level = 1.65463 (upward trend)
4.70481 > 1.65463 indicating an upward trend

Mann-Kendall Trend Analysis

Parameter: Sulfate

Location: MW-5

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 83 - 1 = 82

Tied Grou	Value	Members
1	5	7

Time Period	Observations
4/28/2016	1
5/9/2016	1
11/10/2016	1
6/8/2017	1
9/28/2017	1
12/11/2017	1
3/21/2018	1
6/19/2018	1
9/12/2018	1
12/4/2018	1
3/5/2019	1
6/4/2019	1
9/5/2019	1
11/20/2019	1
2/27/2020	1

There are 0 time periods with multiple data

A = 798
B = 0
C = 210
D = 0
E = 42
F = 0
a = 7350
b = 24570
c = 420
Group Variance = 364
Z-Score = 4.24555
Comparison Level at 95% confidence level = 1.65463 (upward trend)
4.24555 > 1.65463 indicating an upward trend

APPENDIX C
LABORATORY ANALYTICAL REPORTS & FIELD INFORMATION LOGS

Pace Analytical®
National Center for Testing & Innovation

ANALYTICAL REPORT

March 06, 2020

Civil & Environmental Consultants - TN

Sample Delivery Group:	L1194169
Samples Received:	02/28/2020
Project Number:	181-364
Description:	Former EWS Camden Class 2 Landfill
Site:	CAMDEN, TN
Report To:	Philip Campbell 117 Seaboard Ln. Suite E100 Franklin, TN 37067

Entire Report Reviewed By:

Chris McCord
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.

MW-1 L1194169-01 GW

Collected by: PC/AB | Collected date/time: 02/27/20 11:05 | Received date/time: 02/28/20 14:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 130.1	WG1435790	1	02/29/20 10:23	03/04/20 11:58	BAM	Mt. Juliet, TN
Wet Chemistry by Method 2320 B-2011	WG1436524	1	03/04/20 20:02	03/04/20 20:02	LEB	Mt. Juliet, TN
Wet Chemistry by Method 350.1	WG1435944	1	03/03/20 12:30	03/03/20 12:30	AJC	Mt. Juliet, TN
Wet Chemistry by Method 410.4	WG1436347	1	03/01/20 09:00	03/01/20 12:22	BAM	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1435898	1	02/28/20 17:32	02/28/20 17:32	LBR	Mt. Juliet, TN
Mercury by Method 7470A	WG1436731	1	03/02/20 20:42	03/03/20 09:27	TRB	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1435911	1	03/02/20 20:57	03/03/20 10:44	CCE	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1436122	1	03/02/20 17:47	03/02/20 20:44	LD	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1436296	1	03/01/20 02:40	03/01/20 02:40	JCP	Mt. Juliet, TN
EDB / DBCP by Method 8011	WG1436627	1	03/02/20 09:09	03/03/20 16:39	LEL	Mt. Juliet, TN

MW-3 L1194169-02 GW

Collected by: PC/AB | Collected date/time: 02/27/20 13:50 | Received date/time: 02/28/20 14:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 130.1	WG1435790	1	02/29/20 10:23	03/04/20 11:58	BAM	Mt. Juliet, TN
Wet Chemistry by Method 2320 B-2011	WG1436524	1	03/04/20 20:08	03/04/20 20:08	LEB	Mt. Juliet, TN
Wet Chemistry by Method 350.1	WG1435944	1	03/03/20 12:40	03/03/20 12:40	AJC	Mt. Juliet, TN
Wet Chemistry by Method 410.4	WG1436347	1	03/01/20 09:00	03/01/20 12:22	BAM	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1435898	1	02/28/20 18:07	02/28/20 18:07	LBR	Mt. Juliet, TN
Mercury by Method 7470A	WG1436731	1	03/02/20 20:42	03/03/20 09:29	TRB	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1435911	1	03/02/20 20:57	03/03/20 10:47	CCE	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1436122	1	03/02/20 17:47	03/02/20 20:58	LD	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1436296	1	03/01/20 03:00	03/01/20 03:00	JCP	Mt. Juliet, TN
EDB / DBCP by Method 8011	WG1436627	1	03/02/20 09:09	03/03/20 16:51	LEL	Mt. Juliet, TN

MW-4 L1194169-03 GW

Collected by: PC/AB | Collected date/time: 02/27/20 13:10 | Received date/time: 02/28/20 14:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 130.1	WG1435790	1	02/29/20 10:23	03/04/20 11:59	BAM	Mt. Juliet, TN
Wet Chemistry by Method 2320 B-2011	WG1436524	1	03/04/20 20:14	03/04/20 20:14	LEB	Mt. Juliet, TN
Wet Chemistry by Method 350.1	WG1435944	1	03/03/20 12:42	03/03/20 12:42	AJC	Mt. Juliet, TN
Wet Chemistry by Method 410.4	WG1436347	1	03/01/20 09:00	03/01/20 12:22	BAM	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1435898	1	02/28/20 18:43	02/28/20 18:43	LBR	Mt. Juliet, TN
Mercury by Method 7470A	WG1436731	1	03/02/20 20:42	03/03/20 09:31	TRB	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1435911	1	03/02/20 20:57	03/03/20 10:50	CCE	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1436122	1	03/02/20 17:47	03/02/20 21:05	LD	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1436296	1	03/01/20 03:20	03/01/20 03:20	JCP	Mt. Juliet, TN
EDB / DBCP by Method 8011	WG1436627	1	03/02/20 09:09	03/03/20 17:03	LEL	Mt. Juliet, TN

MW-5 L1194169-04 GW

Collected by: PC/AB | Collected date/time: 02/27/20 12:05 | Received date/time: 02/28/20 14:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 130.1	WG1435790	1	02/29/20 10:23	03/04/20 12:00	BAM	Mt. Juliet, TN
Wet Chemistry by Method 2320 B-2011	WG1436524	1	03/04/20 20:22	03/04/20 20:22	LEB	Mt. Juliet, TN
Wet Chemistry by Method 350.1	WG1435944	1	03/03/20 12:44	03/03/20 12:44	AJC	Mt. Juliet, TN
Wet Chemistry by Method 410.4	WG1436347	1	03/01/20 09:00	03/01/20 12:23	BAM	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1435898	1	02/28/20 19:19	02/28/20 19:19	LBR	Mt. Juliet, TN
Mercury by Method 7470A	WG1436731	1	03/02/20 20:42	03/03/20 09:33	TRB	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1435911	1	03/02/20 20:57	03/03/20 10:58	CCE	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1436122	1	03/02/20 17:47	03/02/20 21:08	LD	Mt. Juliet, TN

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

MW-5 L1194169-04 GW

Collected by	Collected date/time	Received date/time
PC/AB	02/27/20 12:05	02/28/20 14:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1436755	1	03/02/20 13:13	03/02/20 13:13	ACG	Mt. Juliet, TN
EDB / DBCP by Method 8011	WG1436627	1	03/02/20 09:09	03/03/20 17:14	LEL	Mt. Juliet, TN

TMW-1 L1194169-05 GW

Collected by	Collected date/time	Received date/time
PC/AB	02/27/20 12:40	02/28/20 14:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 130.1	WG1435790	1	02/29/20 10:23	03/04/20 12:03	BAM	Mt. Juliet, TN
Wet Chemistry by Method 2320 B-2011	WG1436524	1	03/04/20 20:27	03/04/20 20:27	LEB	Mt. Juliet, TN
Wet Chemistry by Method 350.1	WG1435944	1	03/03/20 12:45	03/03/20 12:45	AJC	Mt. Juliet, TN
Wet Chemistry by Method 410.4	WG1436347	1	03/01/20 09:00	03/01/20 12:23	BAM	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1435898	1	02/28/20 19:37	02/28/20 19:37	LBR	Mt. Juliet, TN
Mercury by Method 7470A	WG1436731	1	03/02/20 20:42	03/03/20 09:35	TRB	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1435911	1	03/02/20 20:57	03/03/20 11:01	CCE	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1436122	1	03/02/20 17:47	03/02/20 21:21	LD	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1436755	1	03/02/20 13:33	03/02/20 13:33	ACG	Mt. Juliet, TN
EDB / DBCP by Method 8011	WG1436627	1	03/02/20 09:09	03/03/20 17:26	LEL	Mt. Juliet, TN

TMW-2 L1194169-06 GW

Collected by	Collected date/time	Received date/time
PC/AB	02/27/20 14:30	02/28/20 14:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 130.1	WG1435790	1	02/29/20 10:23	03/04/20 12:04	BAM	Mt. Juliet, TN
Wet Chemistry by Method 2320 B-2011	WG1436524	1	03/04/20 20:34	03/04/20 20:34	LEB	Mt. Juliet, TN
Wet Chemistry by Method 350.1	WG1435944	1	03/03/20 12:47	03/03/20 12:47	AJC	Mt. Juliet, TN
Wet Chemistry by Method 410.4	WG1436347	1	03/01/20 09:00	03/01/20 12:23	BAM	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1435898	1	02/28/20 20:30	02/28/20 20:30	LBR	Mt. Juliet, TN
Mercury by Method 7470A	WG1436731	1	03/02/20 20:42	03/03/20 09:37	TRB	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1435911	1	03/02/20 20:57	03/03/20 11:04	CCE	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1436122	1	03/02/20 17:47	03/02/20 21:24	LD	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1436755	1	03/02/20 13:52	03/02/20 13:52	ACG	Mt. Juliet, TN
EDB / DBCP by Method 8011	WG1436627	1	03/02/20 09:09	03/03/20 17:38	LEL	Mt. Juliet, TN

TMW-3 L1194169-07 GW

Collected by	Collected date/time	Received date/time
PC/AB	02/27/20 15:45	02/28/20 14:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 130.1	WG1435790	1	02/29/20 10:23	03/04/20 12:04	BAM	Mt. Juliet, TN
Wet Chemistry by Method 2320 B-2011	WG1436524	1	03/04/20 20:40	03/04/20 20:40	LEB	Mt. Juliet, TN
Wet Chemistry by Method 350.1	WG1435944	1	03/03/20 12:49	03/03/20 12:49	AJC	Mt. Juliet, TN
Wet Chemistry by Method 410.4	WG1436347	1	03/01/20 09:00	03/01/20 12:23	BAM	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1435898	1	02/28/20 21:24	02/28/20 21:24	LBR	Mt. Juliet, TN
Mercury by Method 7470A	WG1436731	1	03/02/20 20:42	03/03/20 09:43	TRB	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1436814	1	03/03/20 13:47	03/03/20 21:07	CCE	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1436122	1	03/02/20 17:47	03/02/20 21:28	LD	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1436755	1	03/02/20 14:12	03/02/20 14:12	ACG	Mt. Juliet, TN
EDB / DBCP by Method 8011	WG1436627	1	03/02/20 09:09	03/03/20 17:50	LEL	Mt. Juliet, TN

DUPLICATE L1194169-08 GW

Collected by	Collected date/time	Received date/time
PC/AB	02/27/20 00:00	02/28/20 14:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 130.1	WG1435790	1	02/29/20 10:23	03/04/20 12:05	BAM	Mt. Juliet, TN
Wet Chemistry by Method 2320 B-2011	WG1436524	1	03/04/20 20:54	03/04/20 20:54	LEB	Mt. Juliet, TN
Wet Chemistry by Method 350.1	WG1435944	1	03/03/20 12:52	03/03/20 12:52	AJC	Mt. Juliet, TN
Wet Chemistry by Method 410.4	WG1436347	1	03/01/20 09:00	03/01/20 12:23	BAM	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1435898	1	02/28/20 21:42	02/28/20 21:42	LBR	Mt. Juliet, TN
Mercury by Method 7470A	WG1436731	1	03/02/20 20:42	03/03/20 09:45	TRB	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1436814	1	03/03/20 13:47	03/03/20 21:10	CCE	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1436122	1	03/02/20 17:47	03/02/20 21:31	LD	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1436755	1	03/02/20 14:31	03/02/20 14:31	ACG	Mt. Juliet, TN
EDB / DBCP by Method 8011	WG1436627	1	03/02/20 09:09	03/03/20 18:02	LEL	Mt. Juliet, TN

FIELD BLANK L1194169-09 GW

Collected by	Collected date/time	Received date/time
PC/AB	02/27/20 14:45	02/28/20 14:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 130.1	WG1435790	1	02/29/20 10:23	03/04/20 12:06	BAM	Mt. Juliet, TN
Wet Chemistry by Method 2320 B-2011	WG1436524	1	03/04/20 21:00	03/04/20 21:00	LEB	Mt. Juliet, TN
Wet Chemistry by Method 350.1	WG1435944	1	03/03/20 12:55	03/03/20 12:55	AJC	Mt. Juliet, TN
Wet Chemistry by Method 410.4	WG1436347	1	03/01/20 09:00	03/01/20 12:23	BAM	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1435898	1	02/28/20 22:18	02/28/20 22:18	LBR	Mt. Juliet, TN
Mercury by Method 7470A	WG1436731	1	03/02/20 20:42	03/03/20 09:47	TRB	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1435913	1	03/02/20 17:03	03/03/20 22:53	CCE	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1436122	1	03/02/20 17:47	03/02/20 21:34	LD	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1437026	1	03/02/20 22:40	03/02/20 22:40	JCP	Mt. Juliet, TN
EDB / DBCP by Method 8011	WG1436627	1	03/02/20 09:09	03/03/20 18:14	LEL	Mt. Juliet, TN

TRIP BLANK L1194169-10 GW

Collected by	Collected date/time	Received date/time
PC/AB	02/27/20 00:00	02/28/20 14:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1437026	1	03/02/20 22:59	03/02/20 22:59	JCP	Mt. Juliet, TN

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Chris McCord
Project Manager

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (colorimetric) as CaCO3	31.1	B	30.0	1	03/04/2020 11:58	WG1435790

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Alkalinity	57.7		20.0	1	03/04/2020 20:02	WG1436524

Sample Narrative:
L1194169-01 WG1436524: Endpoint pH 4.5

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Ammonia Nitrogen	0.140		0.100	1	03/03/2020 12:30	WG1435944

Wet Chemistry by Method 410.4

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
COD	ND		10.0	1	03/01/2020 12:22	WG1436347

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		1.00	1	02/28/2020 17:32	WG1435898
Chloride	1.95		1.00	1	02/28/2020 17:32	WG1435898
Fluoride	ND		0.100	1	02/28/2020 17:32	WG1435898
Nitrate	0.182		0.100	1	02/28/2020 17:32	WG1435898
Sulfate	5.72		5.00	1	02/28/2020 17:32	WG1435898

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	0.000797		0.000200	1	03/03/2020 09:27	WG1436731

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	ND		0.200	1	03/03/2020 10:44	WG1435911

Metals (ICPMS) by Method 6020A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	ND		0.100	1	03/02/2020 20:44	WG1436122
Antimony	ND		0.00200	1	03/02/2020 20:44	WG1436122
Arsenic	0.00807		0.00200	1	03/02/2020 20:44	WG1436122
Barium	0.0243	O1	0.00500	1	03/02/2020 20:44	WG1436122
Beryllium	ND		0.00200	1	03/02/2020 20:44	WG1436122
Cadmium	ND		0.00100	1	03/02/2020 20:44	WG1436122
Calcium	6.06		1.00	1	03/02/2020 20:44	WG1436122
Chromium	ND		0.00200	1	03/02/2020 20:44	WG1436122
Cobalt	0.0744		0.00200	1	03/02/2020 20:44	WG1436122
Copper	ND		0.00500	1	03/02/2020 20:44	WG1436122

Metals (ICPMS) by Method 6020A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Iron	12.3		0.100	1	03/02/2020 20:44	WG1436122
Lead	ND		0.00200	1	03/02/2020 20:44	WG1436122
Magnesium	3.52		1.00	1	03/02/2020 20:44	WG1436122
Manganese	1.21	V	0.00500	1	03/02/2020 20:44	WG1436122
Nickel	0.00803		0.00200	1	03/02/2020 20:44	WG1436122
Potassium	1.28		1.00	1	03/02/2020 20:44	WG1436122
Selenium	ND		0.00200	1	03/02/2020 20:44	WG1436122
Silver	ND		0.00200	1	03/02/2020 20:44	WG1436122
Sodium	3.27		1.00	1	03/02/2020 20:44	WG1436122
Thallium	ND		0.00200	1	03/02/2020 20:44	WG1436122
Vanadium	ND		0.00500	1	03/02/2020 20:44	WG1436122
Zinc	ND		0.0250	1	03/02/2020 20:44	WG1436122

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Acetone	ND	J3 J4	0.0500	1	03/01/2020 02:40	WG1436296
Acrylonitrile	ND		0.0100	1	03/01/2020 02:40	WG1436296
Benzene	ND		0.00100	1	03/01/2020 02:40	WG1436296
Bromochloromethane	ND		0.00100	1	03/01/2020 02:40	WG1436296
Bromodichloromethane	ND		0.00100	1	03/01/2020 02:40	WG1436296
Bromoform	ND		0.00100	1	03/01/2020 02:40	WG1436296
Bromomethane	ND		0.00500	1	03/01/2020 02:40	WG1436296
Carbon disulfide	ND		0.00100	1	03/01/2020 02:40	WG1436296
Carbon tetrachloride	ND		0.00100	1	03/01/2020 02:40	WG1436296
Chlorobenzene	ND		0.00100	1	03/01/2020 02:40	WG1436296
Chlorodibromomethane	ND		0.00100	1	03/01/2020 02:40	WG1436296
Chloroethane	ND		0.00500	1	03/01/2020 02:40	WG1436296
Chloroform	ND		0.00500	1	03/01/2020 02:40	WG1436296
Chloromethane	ND		0.00250	1	03/01/2020 02:40	WG1436296
Dibromomethane	ND		0.00100	1	03/01/2020 02:40	WG1436296
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	03/01/2020 02:40	WG1436296
1,2-Dibromoethane	ND		0.00100	1	03/01/2020 02:40	WG1436296
1,2-Dichlorobenzene	ND		0.00100	1	03/01/2020 02:40	WG1436296
1,4-Dichlorobenzene	ND		0.00100	1	03/01/2020 02:40	WG1436296
trans-1,4-Dichloro-2-butene	ND		0.00250	1	03/01/2020 02:40	WG1436296
1,1-Dichloroethane	ND		0.00100	1	03/01/2020 02:40	WG1436296
1,2-Dichloroethane	ND		0.00100	1	03/01/2020 02:40	WG1436296
1,1-Dichloroethene	ND		0.00100	1	03/01/2020 02:40	WG1436296
cis-1,2-Dichloroethene	ND		0.00100	1	03/01/2020 02:40	WG1436296
trans-1,2-Dichloroethene	ND		0.00100	1	03/01/2020 02:40	WG1436296
1,2-Dichloropropane	ND		0.00100	1	03/01/2020 02:40	WG1436296
cis-1,3-Dichloropropene	ND		0.00100	1	03/01/2020 02:40	WG1436296
trans-1,3-Dichloropropene	ND		0.00100	1	03/01/2020 02:40	WG1436296
Ethylbenzene	ND		0.00100	1	03/01/2020 02:40	WG1436296
2-Hexanone	ND		0.0100	1	03/01/2020 02:40	WG1436296
Iodomethane	ND		0.0100	1	03/01/2020 02:40	WG1436296
2-Butanone (MEK)	ND		0.0100	1	03/01/2020 02:40	WG1436296
Methylene Chloride	ND		0.00500	1	03/01/2020 02:40	WG1436296
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	03/01/2020 02:40	WG1436296
Styrene	ND		0.00100	1	03/01/2020 02:40	WG1436296
1,1,1,2-Tetrachloroethane	ND		0.00100	1	03/01/2020 02:40	WG1436296
1,1,2,2-Tetrachloroethane	ND		0.00100	1	03/01/2020 02:40	WG1436296
Tetrachloroethene	ND		0.00100	1	03/01/2020 02:40	WG1436296
Toluene	ND		0.00100	1	03/01/2020 02:40	WG1436296
1,1,1-Trichloroethane	ND		0.00100	1	03/01/2020 02:40	WG1436296

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
1,1,2-Trichloroethane	ND		0.00100	1	03/01/2020 02:40	WG1436296
Trichloroethene	ND		0.00100	1	03/01/2020 02:40	WG1436296
Trichlorofluoromethane	ND		0.00500	1	03/01/2020 02:40	WG1436296
1,2,3-Trichloropropane	ND		0.00250	1	03/01/2020 02:40	WG1436296
Vinyl acetate	ND		0.0100	1	03/01/2020 02:40	WG1436296
Vinyl chloride	ND		0.00100	1	03/01/2020 02:40	WG1436296
Xylenes, Total	ND		0.00300	1	03/01/2020 02:40	WG1436296
(S) Toluene-d8	*97.8*		*80.0-120*		*03/01/2020 02:40*	WG1436296
(S) 4-Bromofluorobenzene	*99.7*		*77.0-126*		*03/01/2020 02:40*	WG1436296
(S) 1,2-Dichloroethane-d4	*119*		*70.0-130*		*03/01/2020 02:40*	WG1436296

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000100	1	03/03/2020 16:39	WG1436627
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	03/03/2020 16:39	WG1436627

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (colorimetric) as CaCO3	74.9		30.0	1	03/04/2020 11:58	WG1435790

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Alkalinity	ND		20.0	1	03/04/2020 20:08	WG1436524

Sample Narrative:
L1194169-02 WG1436524: Endpoint pH 4.5

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Ammonia Nitrogen	ND		0.100	1	03/03/2020 12:40	WG1435944

Wet Chemistry by Method 410.4

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
COD	ND		10.0	1	03/01/2020 12:22	WG1436347

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		1.00	1	02/28/2020 18:07	WG1435898
Chloride	17.8		1.00	1	02/28/2020 18:07	WG1435898
Fluoride	0.161		0.100	1	02/28/2020 18:07	WG1435898
Nitrate	1.04		0.100	1	02/28/2020 18:07	WG1435898
Sulfate	62.0		5.00	1	02/28/2020 18:07	WG1435898

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	03/03/2020 09:29	WG1436731

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	ND		0.200	1	03/03/2020 10:47	WG1435911

Metals (ICPMS) by Method 6020A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	0.238		0.100	1	03/02/2020 20:58	WG1436122
Antimony	ND		0.00200	1	03/02/2020 20:58	WG1436122
Arsenic	ND		0.00200	1	03/02/2020 20:58	WG1436122
Barium	0.0460		0.00500	1	03/02/2020 20:58	WG1436122
Beryllium	ND		0.00200	1	03/02/2020 20:58	WG1436122
Cadmium	0.00214		0.00100	1	03/02/2020 20:58	WG1436122
Calcium	18.8		1.00	1	03/02/2020 20:58	WG1436122
Chromium	ND		0.00200	1	03/02/2020 20:58	WG1436122
Cobalt	ND		0.00200	1	03/02/2020 20:58	WG1436122
Copper	ND		0.00500	1	03/02/2020 20:58	WG1436122

Metals (ICPMS) by Method 6020A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Iron	0.101		0.100	1	03/02/2020 20:58	WG1436122
Lead	ND		0.00200	1	03/02/2020 20:58	WG1436122
Magnesium	6.73		1.00	1	03/02/2020 20:58	WG1436122
Manganese	0.175		0.00500	1	03/02/2020 20:58	WG1436122
Nickel	0.00326		0.00200	1	03/02/2020 20:58	WG1436122
Potassium	3.74		1.00	1	03/02/2020 20:58	WG1436122
Selenium	ND		0.00200	1	03/02/2020 20:58	WG1436122
Silver	ND		0.00200	1	03/02/2020 20:58	WG1436122
Sodium	10.3		1.00	1	03/02/2020 20:58	WG1436122
Thallium	ND		0.00200	1	03/02/2020 20:58	WG1436122
Vanadium	ND		0.00500	1	03/02/2020 20:58	WG1436122
Zinc	ND		0.0250	1	03/02/2020 20:58	WG1436122

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Acetone	ND	J3 J4	0.0500	1	03/01/2020 03:00	WG1436296
Acrylonitrile	ND		0.0100	1	03/01/2020 03:00	WG1436296
Benzene	ND		0.00100	1	03/01/2020 03:00	WG1436296
Bromochloromethane	ND		0.00100	1	03/01/2020 03:00	WG1436296
Bromodichloromethane	ND		0.00100	1	03/01/2020 03:00	WG1436296
Bromoform	ND		0.00100	1	03/01/2020 03:00	WG1436296
Bromomethane	ND		0.00500	1	03/01/2020 03:00	WG1436296
Carbon disulfide	ND		0.00100	1	03/01/2020 03:00	WG1436296
Carbon tetrachloride	ND		0.00100	1	03/01/2020 03:00	WG1436296
Chlorobenzene	ND		0.00100	1	03/01/2020 03:00	WG1436296
Chlorodibromomethane	ND		0.00100	1	03/01/2020 03:00	WG1436296
Chloroethane	ND		0.00500	1	03/01/2020 03:00	WG1436296
Chloroform	ND		0.00500	1	03/01/2020 03:00	WG1436296
Chloromethane	ND		0.00250	1	03/01/2020 03:00	WG1436296
Dibromomethane	ND		0.00100	1	03/01/2020 03:00	WG1436296
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	03/01/2020 03:00	WG1436296
1,2-Dibromoethane	ND		0.00100	1	03/01/2020 03:00	WG1436296
1,2-Dichlorobenzene	ND		0.00100	1	03/01/2020 03:00	WG1436296
1,4-Dichlorobenzene	ND		0.00100	1	03/01/2020 03:00	WG1436296
trans-1,4-Dichloro-2-butene	ND		0.00250	1	03/01/2020 03:00	WG1436296
1,1-Dichloroethane	ND		0.00100	1	03/01/2020 03:00	WG1436296
1,2-Dichloroethane	ND		0.00100	1	03/01/2020 03:00	WG1436296
1,1-Dichloroethene	ND		0.00100	1	03/01/2020 03:00	WG1436296
cis-1,2-Dichloroethene	ND		0.00100	1	03/01/2020 03:00	WG1436296
trans-1,2-Dichloroethene	ND		0.00100	1	03/01/2020 03:00	WG1436296
1,2-Dichloropropane	ND		0.00100	1	03/01/2020 03:00	WG1436296
cis-1,3-Dichloropropene	ND		0.00100	1	03/01/2020 03:00	WG1436296
trans-1,3-Dichloropropene	ND		0.00100	1	03/01/2020 03:00	WG1436296
Ethylbenzene	ND		0.00100	1	03/01/2020 03:00	WG1436296
2-Hexanone	ND		0.0100	1	03/01/2020 03:00	WG1436296
Iodomethane	ND		0.0100	1	03/01/2020 03:00	WG1436296
2-Butanone (MEK)	ND		0.0100	1	03/01/2020 03:00	WG1436296
Methylene Chloride	ND		0.00500	1	03/01/2020 03:00	WG1436296
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	03/01/2020 03:00	WG1436296
Styrene	ND		0.00100	1	03/01/2020 03:00	WG1436296
1,1,1,2-Tetrachloroethane	ND		0.00100	1	03/01/2020 03:00	WG1436296
1,1,2,2-Tetrachloroethane	ND		0.00100	1	03/01/2020 03:00	WG1436296
Tetrachloroethene	ND		0.00100	1	03/01/2020 03:00	WG1436296
Toluene	ND		0.00100	1	03/01/2020 03:00	WG1436296
1,1,1-Trichloroethane	ND		0.00100	1	03/01/2020 03:00	WG1436296

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
1,1,2-Trichloroethane	ND		0.00100	1	03/01/2020 03:00	WG1436296
Trichloroethene	ND		0.00100	1	03/01/2020 03:00	WG1436296
Trichlorofluoromethane	ND		0.00500	1	03/01/2020 03:00	WG1436296
1,2,3-Trichloropropane	ND		0.00250	1	03/01/2020 03:00	WG1436296
Vinyl acetate	ND		0.0100	1	03/01/2020 03:00	WG1436296
Vinyl chloride	ND		0.00100	1	03/01/2020 03:00	WG1436296
Xylenes, Total	ND		0.00300	1	03/01/2020 03:00	WG1436296
(S) Toluene-d8	*96.7*		*80.0-120*		*03/01/2020 03:00*	WG1436296
(S) 4-Bromofluorobenzene	*101*		*77.0-126*		*03/01/2020 03:00*	WG1436296
(S) 1,2-Dichloroethane-d4	*117*		*70.0-130*		*03/01/2020 03:00*	WG1436296

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000100	1	03/03/2020 16:51	WG1436627
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	03/03/2020 16:51	WG1436627

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

Wet Chemistry by Method 130.1

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Hardness (colorimetric) as CaCO3	ND		30.0	1	03/04/2020 11:59	WG1435790

Wet Chemistry by Method 2320 B-2011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Alkalinity	20.6	B	20.0	1	03/04/2020 20:14	WG1436524

Sample Narrative:
L1194169-03 WG1436524: Endpoint pH 4.5

Wet Chemistry by Method 350.1

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ammonia Nitrogen	ND		0.100	1	03/03/2020 12:42	WG1435944

Wet Chemistry by Method 410.4

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
COD	ND		10.0	1	03/01/2020 12:22	WG1436347

Wet Chemistry by Method 9056A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Bromide	ND		1.00	1	02/28/2020 18:43	WG1435898
Chloride	7.87		1.00	1	02/28/2020 18:43	WG1435898
Fluoride	ND		0.100	1	02/28/2020 18:43	WG1435898
Nitrate	0.611		0.100	1	02/28/2020 18:43	WG1435898
Sulfate	ND		5.00	1	02/28/2020 18:43	WG1435898

Mercury by Method 7470A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Mercury	ND		0.000200	1	03/03/2020 09:31	WG1436731

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Boron	ND		0.200	1	03/03/2020 10:50	WG1435911

Metals (ICPMS) by Method 6020A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Aluminum	ND		0.100	1	03/02/2020 21:05	WG1436122
Antimony	ND		0.00200	1	03/02/2020 21:05	WG1436122
Arsenic	ND		0.00200	1	03/02/2020 21:05	WG1436122
Barium	0.00747		0.00500	1	03/02/2020 21:05	WG1436122
Beryllium	ND		0.00200	1	03/02/2020 21:05	WG1436122
Cadmium	ND		0.00100	1	03/02/2020 21:05	WG1436122
Calcium	4.70		1.00	1	03/02/2020 21:05	WG1436122
Chromium	ND		0.00200	1	03/02/2020 21:05	WG1436122
Cobalt	ND		0.00200	1	03/02/2020 21:05	WG1436122
Copper	ND		0.00500	1	03/02/2020 21:05	WG1436122

Metals (ICPMS) by Method 6020A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Iron	0.126		0.100	1	03/02/2020 21:05	WG1436122
Lead	ND		0.00200	1	03/02/2020 21:05	WG1436122
Magnesium	2.80		1.00	1	03/02/2020 21:05	WG1436122
Manganese	0.0141		0.00500	1	03/02/2020 21:05	WG1436122
Nickel	ND		0.00200	1	03/02/2020 21:05	WG1436122
Potassium	ND		1.00	1	03/02/2020 21:05	WG1436122
Selenium	ND		0.00200	1	03/02/2020 21:05	WG1436122
Silver	ND		0.00200	1	03/02/2020 21:05	WG1436122
Sodium	3.30		1.00	1	03/02/2020 21:05	WG1436122
Thallium	ND		0.00200	1	03/02/2020 21:05	WG1436122
Vanadium	ND		0.00500	1	03/02/2020 21:05	WG1436122
Zinc	ND		0.0250	1	03/02/2020 21:05	WG1436122

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Acetone	ND	J3 J4	0.0500	1	03/01/2020 03:20	WG1436296
Acrylonitrile	ND		0.0100	1	03/01/2020 03:20	WG1436296
Benzene	ND		0.00100	1	03/01/2020 03:20	WG1436296
Bromochloromethane	ND		0.00100	1	03/01/2020 03:20	WG1436296
Bromodichloromethane	ND		0.00100	1	03/01/2020 03:20	WG1436296
Bromoform	ND		0.00100	1	03/01/2020 03:20	WG1436296
Bromomethane	ND		0.00500	1	03/01/2020 03:20	WG1436296
Carbon disulfide	ND		0.00100	1	03/01/2020 03:20	WG1436296
Carbon tetrachloride	ND		0.00100	1	03/01/2020 03:20	WG1436296
Chlorobenzene	ND		0.00100	1	03/01/2020 03:20	WG1436296
Chlorodibromomethane	ND		0.00100	1	03/01/2020 03:20	WG1436296
Chloroethane	ND		0.00500	1	03/01/2020 03:20	WG1436296
Chloroform	ND		0.00500	1	03/01/2020 03:20	WG1436296
Chloromethane	ND		0.00250	1	03/01/2020 03:20	WG1436296
Dibromomethane	ND		0.00100	1	03/01/2020 03:20	WG1436296
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	03/01/2020 03:20	WG1436296
1,2-Dibromoethane	ND		0.00100	1	03/01/2020 03:20	WG1436296
1,2-Dichlorobenzene	ND		0.00100	1	03/01/2020 03:20	WG1436296
1,4-Dichlorobenzene	ND		0.00100	1	03/01/2020 03:20	WG1436296
trans-1,4-Dichloro-2-butene	ND		0.00250	1	03/01/2020 03:20	WG1436296
1,1-Dichloroethane	ND		0.00100	1	03/01/2020 03:20	WG1436296
1,2-Dichloroethane	ND		0.00100	1	03/01/2020 03:20	WG1436296
1,1-Dichloroethene	ND		0.00100	1	03/01/2020 03:20	WG1436296
cis-1,2-Dichloroethene	ND		0.00100	1	03/01/2020 03:20	WG1436296
trans-1,2-Dichloroethene	ND		0.00100	1	03/01/2020 03:20	WG1436296
1,2-Dichloropropane	ND		0.00100	1	03/01/2020 03:20	WG1436296
cis-1,3-Dichloropropene	ND		0.00100	1	03/01/2020 03:20	WG1436296
trans-1,3-Dichloropropene	ND		0.00100	1	03/01/2020 03:20	WG1436296
Ethylbenzene	ND		0.00100	1	03/01/2020 03:20	WG1436296
2-Hexanone	ND		0.0100	1	03/01/2020 03:20	WG1436296
Iodomethane	ND		0.0100	1	03/01/2020 03:20	WG1436296
2-Butanone (MEK)	ND		0.0100	1	03/01/2020 03:20	WG1436296
Methylene Chloride	ND		0.00500	1	03/01/2020 03:20	WG1436296
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	03/01/2020 03:20	WG1436296
Styrene	ND		0.00100	1	03/01/2020 03:20	WG1436296
1,1,1,2-Tetrachloroethane	ND		0.00100	1	03/01/2020 03:20	WG1436296
1,1,2,2-Tetrachloroethane	ND		0.00100	1	03/01/2020 03:20	WG1436296
Tetrachloroethene	ND		0.00100	1	03/01/2020 03:20	WG1436296
Toluene	ND		0.00100	1	03/01/2020 03:20	WG1436296
1,1,1-Trichloroethane	ND		0.00100	1	03/01/2020 03:20	WG1436296

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
1,1,2-Trichloroethane	ND		0.00100	1	03/01/2020 03:20	WG1436296
Trichloroethene	ND		0.00100	1	03/01/2020 03:20	WG1436296
Trichlorofluoromethane	ND		0.00500	1	03/01/2020 03:20	WG1436296
1,2,3-Trichloropropane	ND		0.00250	1	03/01/2020 03:20	WG1436296
Vinyl acetate	ND		0.0100	1	03/01/2020 03:20	WG1436296
Vinyl chloride	ND		0.00100	1	03/01/2020 03:20	WG1436296
Xylenes, Total	ND		0.00300	1	03/01/2020 03:20	WG1436296
(S) Toluene-d8	*98.3*		*80.0-120*		*03/01/2020 03:20*	WG1436296
(S) 4-Bromofluorobenzene	*103*		*77.0-126*		*03/01/2020 03:20*	WG1436296
(S) 1,2-Dichloroethane-d4	*119*		*70.0-130*		*03/01/2020 03:20*	WG1436296

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000100	1	03/03/2020 17:03	WG1436627
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	03/03/2020 17:03	WG1436627

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (colorimetric) as CaCO3	102		30.0	1	03/04/2020 12:00	WG1435790

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Alkalinity	ND		20.0	1	03/04/2020 20:22	WG1436524

Sample Narrative:
L1194169-04 WG1436524: Endpoint pH 4.5

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Ammonia Nitrogen	ND		0.100	1	03/03/2020 12:44	WG1435944

Wet Chemistry by Method 410.4

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
COD	ND		10.0	1	03/01/2020 12:23	WG1436347

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		1.00	1	02/28/2020 19:19	WG1435898
Chloride	80.4		1.00	1	02/28/2020 19:19	WG1435898
Fluoride	ND		0.100	1	02/28/2020 19:19	WG1435898
Nitrate	1.39		0.100	1	02/28/2020 19:19	WG1435898
Sulfate	9.50		5.00	1	02/28/2020 19:19	WG1435898

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	03/03/2020 09:33	WG1436731

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	ND		0.200	1	03/03/2020 10:58	WG1435911

Metals (ICPMS) by Method 6020A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	0.214		0.100	1	03/02/2020 21:08	WG1436122
Antimony	ND		0.00200	1	03/02/2020 21:08	WG1436122
Arsenic	ND		0.00200	1	03/02/2020 21:08	WG1436122
Barium	0.0547		0.00500	1	03/02/2020 21:08	WG1436122
Beryllium	ND		0.00200	1	03/02/2020 21:08	WG1436122
Cadmium	ND		0.00100	1	03/02/2020 21:08	WG1436122
Calcium	18.0		1.00	1	03/02/2020 21:08	WG1436122
Chromium	0.00565	B	0.00200	1	03/02/2020 21:08	WG1436122
Cobalt	0.00234		0.00200	1	03/02/2020 21:08	WG1436122
Copper	ND		0.00500	1	03/02/2020 21:08	WG1436122

Metals (ICPMS) by Method 6020A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Iron	0.249		0.100	1	03/02/2020 21:08	WG1436122
Lead	ND		0.00200	1	03/02/2020 21:08	WG1436122
Magnesium	12.4		1.00	1	03/02/2020 21:08	WG1436122
Manganese	0.227		0.00500	1	03/02/2020 21:08	WG1436122
Nickel	0.00652		0.00200	1	03/02/2020 21:08	WG1436122
Potassium	1.53		1.00	1	03/02/2020 21:08	WG1436122
Selenium	ND		0.00200	1	03/02/2020 21:08	WG1436122
Silver	ND		0.00200	1	03/02/2020 21:08	WG1436122
Sodium	20.6		1.00	1	03/02/2020 21:08	WG1436122
Thallium	ND		0.00200	1	03/02/2020 21:08	WG1436122
Vanadium	ND		0.00500	1	03/02/2020 21:08	WG1436122
Zinc	ND		0.0250	1	03/02/2020 21:08	WG1436122

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Acetone	ND		0.0500	1	03/02/2020 13:13	WG1436755
Acrylonitrile	ND		0.0100	1	03/02/2020 13:13	WG1436755
Benzene	ND		0.00100	1	03/02/2020 13:13	WG1436755
Bromochloromethane	ND		0.00100	1	03/02/2020 13:13	WG1436755
Bromodichloromethane	ND		0.00100	1	03/02/2020 13:13	WG1436755
Bromoform	ND		0.00100	1	03/02/2020 13:13	WG1436755
Bromomethane	ND		0.00500	1	03/02/2020 13:13	WG1436755
Carbon disulfide	ND		0.00100	1	03/02/2020 13:13	WG1436755
Carbon tetrachloride	ND		0.00100	1	03/02/2020 13:13	WG1436755
Chlorobenzene	ND		0.00100	1	03/02/2020 13:13	WG1436755
Chlorodibromomethane	ND		0.00100	1	03/02/2020 13:13	WG1436755
Chloroethane	ND		0.00500	1	03/02/2020 13:13	WG1436755
Chloroform	ND		0.00500	1	03/02/2020 13:13	WG1436755
Chloromethane	ND		0.00250	1	03/02/2020 13:13	WG1436755
Dibromomethane	ND		0.00100	1	03/02/2020 13:13	WG1436755
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	03/02/2020 13:13	WG1436755
1,2-Dibromoethane	ND		0.00100	1	03/02/2020 13:13	WG1436755
1,2-Dichlorobenzene	ND		0.00100	1	03/02/2020 13:13	WG1436755
1,4-Dichlorobenzene	ND		0.00100	1	03/02/2020 13:13	WG1436755
trans-1,4-Dichloro-2-butene	ND		0.00250	1	03/02/2020 13:13	WG1436755
1,1-Dichloroethane	ND		0.00100	1	03/02/2020 13:13	WG1436755
1,2-Dichloroethane	ND		0.00100	1	03/02/2020 13:13	WG1436755
1,1-Dichloroethene	ND		0.00100	1	03/02/2020 13:13	WG1436755
cis-1,2-Dichloroethene	ND		0.00100	1	03/02/2020 13:13	WG1436755
trans-1,2-Dichloroethene	ND		0.00100	1	03/02/2020 13:13	WG1436755
1,2-Dichloropropane	ND		0.00100	1	03/02/2020 13:13	WG1436755
cis-1,3-Dichloropropene	ND		0.00100	1	03/02/2020 13:13	WG1436755
trans-1,3-Dichloropropene	ND		0.00100	1	03/02/2020 13:13	WG1436755
Ethylbenzene	ND		0.00100	1	03/02/2020 13:13	WG1436755
2-Hexanone	ND		0.0100	1	03/02/2020 13:13	WG1436755
Iodomethane	ND		0.0100	1	03/02/2020 13:13	WG1436755
2-Butanone (MEK)	ND		0.0100	1	03/02/2020 13:13	WG1436755
Methylene Chloride	ND		0.00500	1	03/02/2020 13:13	WG1436755
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	03/02/2020 13:13	WG1436755
Styrene	ND		0.00100	1	03/02/2020 13:13	WG1436755
1,1,1,2-Tetrachloroethane	ND		0.00100	1	03/02/2020 13:13	WG1436755
1,1,2,2-Tetrachloroethane	ND		0.00100	1	03/02/2020 13:13	WG1436755
Tetrachloroethene	ND		0.00100	1	03/02/2020 13:13	WG1436755
Toluene	ND		0.00100	1	03/02/2020 13:13	WG1436755
1,1,1-Trichloroethane	ND		0.00100	1	03/02/2020 13:13	WG1436755

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
1,1,2-Trichloroethane	ND		0.00100	1	03/02/2020 13:13	WG1436755
Trichloroethene	ND		0.00100	1	03/02/2020 13:13	WG1436755
Trichlorofluoromethane	ND		0.00500	1	03/02/2020 13:13	WG1436755
1,2,3-Trichloropropane	ND		0.00250	1	03/02/2020 13:13	WG1436755
Vinyl acetate	ND		0.0100	1	03/02/2020 13:13	WG1436755
Vinyl chloride	ND		0.00100	1	03/02/2020 13:13	WG1436755
Xylenes, Total	ND		0.00300	1	03/02/2020 13:13	WG1436755
(S) Toluene-d8	*105*		*80.0-120*		*03/02/2020 13:13*	WG1436755
(S) 4-Bromofluorobenzene	*97.9*		*77.0-126*		*03/02/2020 13:13*	WG1436755
(S) 1,2-Dichloroethane-d4	*106*		*70.0-130*		*03/02/2020 13:13*	WG1436755

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000100	1	03/03/2020 17:14	WG1436627
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	03/03/2020 17:14	WG1436627

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (colorimetric) as CaCO3	39.0	B	30.0	1	03/04/2020 12:03	WG1435790

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Alkalinity	ND		20.0	1	03/04/2020 20:27	WG1436524

Sample Narrative:
L1194169-05 WG1436524: Endpoint pH 4.5

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Ammonia Nitrogen	ND		0.100	1	03/03/2020 12:45	WG1435944

Wet Chemistry by Method 410.4

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
COD	ND		10.0	1	03/01/2020 12:23	WG1436347

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		1.00	1	02/28/2020 19:37	WG1435898
Chloride	19.7		1.00	1	02/28/2020 19:37	WG1435898
Fluoride	ND		0.100	1	02/28/2020 19:37	WG1435898
Nitrate	1.71		0.100	1	02/28/2020 19:37	WG1435898
Sulfate	ND		5.00	1	02/28/2020 19:37	WG1435898

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	03/03/2020 09:35	WG1436731

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	ND		0.200	1	03/03/2020 11:01	WG1435911

Metals (ICPMS) by Method 6020A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	0.382		0.100	1	03/02/2020 21:21	WG1436122
Antimony	ND		0.00200	1	03/02/2020 21:21	WG1436122
Arsenic	ND		0.00200	1	03/02/2020 21:21	WG1436122
Barium	0.0142		0.00500	1	03/02/2020 21:21	WG1436122
Beryllium	ND		0.00200	1	03/02/2020 21:21	WG1436122
Cadmium	ND		0.00100	1	03/02/2020 21:21	WG1436122
Calcium	10.5		1.00	1	03/02/2020 21:21	WG1436122
Chromium	0.00246	B	0.00200	1	03/02/2020 21:21	WG1436122
Cobalt	ND		0.00200	1	03/02/2020 21:21	WG1436122
Copper	ND		0.00500	1	03/02/2020 21:21	WG1436122

Metals (ICPMS) by Method 6020A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Iron	1.07		0.100	1	03/02/2020 21:21	WG1436122
Lead	ND		0.00200	1	03/02/2020 21:21	WG1436122
Magnesium	3.05		1.00	1	03/02/2020 21:21	WG1436122
Manganese	0.0254		0.00500	1	03/02/2020 21:21	WG1436122
Nickel	ND		0.00200	1	03/02/2020 21:21	WG1436122
Potassium	1.01	B	1.00	1	03/02/2020 21:21	WG1436122
Selenium	ND		0.00200	1	03/02/2020 21:21	WG1436122
Silver	ND		0.00200	1	03/02/2020 21:21	WG1436122
Sodium	3.53		1.00	1	03/02/2020 21:21	WG1436122
Thallium	ND		0.00200	1	03/02/2020 21:21	WG1436122
Vanadium	ND		0.00500	1	03/02/2020 21:21	WG1436122
Zinc	ND		0.0250	1	03/02/2020 21:21	WG1436122

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Acetone	ND		0.0500	1	03/02/2020 13:33	WG1436755
Acrylonitrile	ND		0.0100	1	03/02/2020 13:33	WG1436755
Benzene	ND		0.00100	1	03/02/2020 13:33	WG1436755
Bromochloromethane	ND		0.00100	1	03/02/2020 13:33	WG1436755
Bromodichloromethane	ND		0.00100	1	03/02/2020 13:33	WG1436755
Bromoform	ND		0.00100	1	03/02/2020 13:33	WG1436755
Bromomethane	ND		0.00500	1	03/02/2020 13:33	WG1436755
Carbon disulfide	ND		0.00100	1	03/02/2020 13:33	WG1436755
Carbon tetrachloride	ND		0.00100	1	03/02/2020 13:33	WG1436755
Chlorobenzene	ND		0.00100	1	03/02/2020 13:33	WG1436755
Chlorodibromomethane	ND		0.00100	1	03/02/2020 13:33	WG1436755
Chloroethane	ND		0.00500	1	03/02/2020 13:33	WG1436755
Chloroform	ND		0.00500	1	03/02/2020 13:33	WG1436755
Chloromethane	ND		0.00250	1	03/02/2020 13:33	WG1436755
Dibromomethane	ND		0.00100	1	03/02/2020 13:33	WG1436755
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	03/02/2020 13:33	WG1436755
1,2-Dibromoethane	ND		0.00100	1	03/02/2020 13:33	WG1436755
1,2-Dichlorobenzene	ND		0.00100	1	03/02/2020 13:33	WG1436755
1,4-Dichlorobenzene	ND		0.00100	1	03/02/2020 13:33	WG1436755
trans-1,4-Dichloro-2-butene	ND		0.00250	1	03/02/2020 13:33	WG1436755
1,1-Dichloroethane	ND		0.00100	1	03/02/2020 13:33	WG1436755
1,2-Dichloroethane	ND		0.00100	1	03/02/2020 13:33	WG1436755
1,1-Dichloroethene	ND		0.00100	1	03/02/2020 13:33	WG1436755
cis-1,2-Dichloroethene	ND		0.00100	1	03/02/2020 13:33	WG1436755
trans-1,2-Dichloroethene	ND		0.00100	1	03/02/2020 13:33	WG1436755
1,2-Dichloropropane	ND		0.00100	1	03/02/2020 13:33	WG1436755
cis-1,3-Dichloropropene	ND		0.00100	1	03/02/2020 13:33	WG1436755
trans-1,3-Dichloropropene	ND		0.00100	1	03/02/2020 13:33	WG1436755
Ethylbenzene	ND		0.00100	1	03/02/2020 13:33	WG1436755
2-Hexanone	ND		0.0100	1	03/02/2020 13:33	WG1436755
Iodomethane	ND		0.0100	1	03/02/2020 13:33	WG1436755
2-Butanone (MEK)	ND		0.0100	1	03/02/2020 13:33	WG1436755
Methylene Chloride	ND		0.00500	1	03/02/2020 13:33	WG1436755
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	03/02/2020 13:33	WG1436755
Styrene	ND		0.00100	1	03/02/2020 13:33	WG1436755
1,1,1,2-Tetrachloroethane	ND		0.00100	1	03/02/2020 13:33	WG1436755
1,1,2,2-Tetrachloroethane	ND		0.00100	1	03/02/2020 13:33	WG1436755
Tetrachloroethene	ND		0.00100	1	03/02/2020 13:33	WG1436755
Toluene	ND		0.00100	1	03/02/2020 13:33	WG1436755
1,1,1-Trichloroethane	ND		0.00100	1	03/02/2020 13:33	WG1436755

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
1,1,2-Trichloroethane	ND		0.00100	1	03/02/2020 13:33	WG1436755
Trichloroethene	ND		0.00100	1	03/02/2020 13:33	WG1436755
Trichlorofluoromethane	ND		0.00500	1	03/02/2020 13:33	WG1436755
1,2,3-Trichloropropane	ND		0.00250	1	03/02/2020 13:33	WG1436755
Vinyl acetate	ND		0.0100	1	03/02/2020 13:33	WG1436755
Vinyl chloride	ND		0.00100	1	03/02/2020 13:33	WG1436755
Xylenes, Total	ND		0.00300	1	03/02/2020 13:33	WG1436755
(S) Toluene-d8	*105*		*80.0-120*		*03/02/2020 13:33*	WG1436755
(S) 4-Bromofluorobenzene	*96.5*		*77.0-126*		*03/02/2020 13:33*	WG1436755
(S) 1,2-Dichloroethane-d4	*106*		*70.0-130*		*03/02/2020 13:33*	WG1436755

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000100	1	03/03/2020 17:26	WG1436627
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	03/03/2020 17:26	WG1436627

Wet Chemistry by Method 130.1

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Hardness (colorimetric) as CaCO3	46.0	B	30.0	1	03/04/2020 12:04	WG1435790

Wet Chemistry by Method 2320 B-2011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Alkalinity	ND		20.0	1	03/04/2020 20:34	WG1436524

Sample Narrative:
L1194169-06 WG1436524: Endpoint pH 4.5

Wet Chemistry by Method 350.1

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ammonia Nitrogen	ND		0.100	1	03/03/2020 12:47	WG1435944

Wet Chemistry by Method 410.4

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
COD	ND		10.0	1	03/01/2020 12:23	WG1436347

Wet Chemistry by Method 9056A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Bromide	ND		1.00	1	02/28/2020 20:30	WG1435898
Chloride	31.9		1.00	1	02/28/2020 20:30	WG1435898
Fluoride	ND		0.100	1	02/28/2020 20:30	WG1435898
Nitrate	0.898		0.100	1	02/28/2020 20:30	WG1435898
Sulfate	ND		5.00	1	02/28/2020 20:30	WG1435898

Mercury by Method 7470A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Mercury	ND		0.000200	1	03/03/2020 09:37	WG1436731

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Boron	ND		0.200	1	03/03/2020 11:04	WG1435911

Metals (ICPMS) by Method 6020A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Aluminum	0.439		0.100	1	03/02/2020 21:24	WG1436122
Antimony	ND		0.00200	1	03/02/2020 21:24	WG1436122
Arsenic	ND		0.00200	1	03/02/2020 21:24	WG1436122
Barium	0.0323		0.00500	1	03/02/2020 21:24	WG1436122
Beryllium	ND		0.00200	1	03/02/2020 21:24	WG1436122
Cadmium	ND		0.00100	1	03/02/2020 21:24	WG1436122
Calcium	12.1		1.00	1	03/02/2020 21:24	WG1436122
Chromium	ND		0.00200	1	03/02/2020 21:24	WG1436122
Cobalt	ND		0.00200	1	03/02/2020 21:24	WG1436122
Copper	ND		0.00500	1	03/02/2020 21:24	WG1436122

Metals (ICPMS) by Method 6020A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Iron	0.639		0.100	1	03/02/2020 21:24	WG1436122
Lead	ND		0.00200	1	03/02/2020 21:24	WG1436122
Magnesium	4.46		1.00	1	03/02/2020 21:24	WG1436122
Manganese	0.00937		0.00500	1	03/02/2020 21:24	WG1436122
Nickel	ND		0.00200	1	03/02/2020 21:24	WG1436122
Potassium	1.12	B	1.00	1	03/02/2020 21:24	WG1436122
Selenium	ND		0.00200	1	03/02/2020 21:24	WG1436122
Silver	ND		0.00200	1	03/02/2020 21:24	WG1436122
Sodium	4.63		1.00	1	03/02/2020 21:24	WG1436122
Thallium	ND		0.00200	1	03/02/2020 21:24	WG1436122
Vanadium	ND		0.00500	1	03/02/2020 21:24	WG1436122
Zinc	ND		0.0250	1	03/02/2020 21:24	WG1436122

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Acetone	ND		0.0500	1	03/02/2020 13:52	WG1436755
Acrylonitrile	ND		0.0100	1	03/02/2020 13:52	WG1436755
Benzene	ND		0.00100	1	03/02/2020 13:52	WG1436755
Bromochloromethane	ND		0.00100	1	03/02/2020 13:52	WG1436755
Bromodichloromethane	ND		0.00100	1	03/02/2020 13:52	WG1436755
Bromoform	ND		0.00100	1	03/02/2020 13:52	WG1436755
Bromomethane	ND		0.00500	1	03/02/2020 13:52	WG1436755
Carbon disulfide	ND		0.00100	1	03/02/2020 13:52	WG1436755
Carbon tetrachloride	ND		0.00100	1	03/02/2020 13:52	WG1436755
Chlorobenzene	ND		0.00100	1	03/02/2020 13:52	WG1436755
Chlorodibromomethane	ND		0.00100	1	03/02/2020 13:52	WG1436755
Chloroethane	ND		0.00500	1	03/02/2020 13:52	WG1436755
Chloroform	ND		0.00500	1	03/02/2020 13:52	WG1436755
Chloromethane	ND		0.00250	1	03/02/2020 13:52	WG1436755
Dibromomethane	ND		0.00100	1	03/02/2020 13:52	WG1436755
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	03/02/2020 13:52	WG1436755
1,2-Dibromoethane	ND		0.00100	1	03/02/2020 13:52	WG1436755
1,2-Dichlorobenzene	ND		0.00100	1	03/02/2020 13:52	WG1436755
1,4-Dichlorobenzene	ND		0.00100	1	03/02/2020 13:52	WG1436755
trans-1,4-Dichloro-2-butene	ND		0.00250	1	03/02/2020 13:52	WG1436755
1,1-Dichloroethane	ND		0.00100	1	03/02/2020 13:52	WG1436755
1,2-Dichloroethane	ND		0.00100	1	03/02/2020 13:52	WG1436755
1,1-Dichloroethene	ND		0.00100	1	03/02/2020 13:52	WG1436755
cis-1,2-Dichloroethene	ND		0.00100	1	03/02/2020 13:52	WG1436755
trans-1,2-Dichloroethene	ND		0.00100	1	03/02/2020 13:52	WG1436755
1,2-Dichloropropane	ND		0.00100	1	03/02/2020 13:52	WG1436755
cis-1,3-Dichloropropene	ND		0.00100	1	03/02/2020 13:52	WG1436755
trans-1,3-Dichloropropene	ND		0.00100	1	03/02/2020 13:52	WG1436755
Ethylbenzene	ND		0.00100	1	03/02/2020 13:52	WG1436755
2-Hexanone	ND		0.0100	1	03/02/2020 13:52	WG1436755
Iodomethane	ND		0.0100	1	03/02/2020 13:52	WG1436755
2-Butanone (MEK)	ND		0.0100	1	03/02/2020 13:52	WG1436755
Methylene Chloride	ND		0.00500	1	03/02/2020 13:52	WG1436755
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	03/02/2020 13:52	WG1436755
Styrene	ND		0.00100	1	03/02/2020 13:52	WG1436755
1,1,1,2-Tetrachloroethane	ND		0.00100	1	03/02/2020 13:52	WG1436755
1,1,2,2-Tetrachloroethane	ND		0.00100	1	03/02/2020 13:52	WG1436755
Tetrachloroethene	ND		0.00100	1	03/02/2020 13:52	WG1436755
Toluene	ND		0.00100	1	03/02/2020 13:52	WG1436755
1,1,1-Trichloroethane	ND		0.00100	1	03/02/2020 13:52	WG1436755

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
1,1,2-Trichloroethane	ND		0.00100	1	03/02/2020 13:52	WG1436755
Trichloroethene	ND		0.00100	1	03/02/2020 13:52	WG1436755
Trichlorofluoromethane	ND		0.00500	1	03/02/2020 13:52	WG1436755
1,2,3-Trichloropropane	ND		0.00250	1	03/02/2020 13:52	WG1436755
Vinyl acetate	ND		0.0100	1	03/02/2020 13:52	WG1436755
Vinyl chloride	ND		0.00100	1	03/02/2020 13:52	WG1436755
Xylenes, Total	ND		0.00300	1	03/02/2020 13:52	WG1436755
(S) Toluene-d8	*104*		*80.0-120*		*03/02/2020 13:52*	WG1436755
(S) 4-Bromofluorobenzene	*97.2*		*77.0-126*		*03/02/2020 13:52*	WG1436755
(S) 1,2-Dichloroethane-d4	*106*		*70.0-130*		*03/02/2020 13:52*	WG1436755

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000100	1	03/03/2020 17:38	WG1436627
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	03/03/2020 17:38	WG1436627

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (colorimetric) as CaCO3	84.7		30.0	1	03/04/2020 12:04	WG1435790

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Alkalinity	ND		20.0	1	03/04/2020 20:40	WG1436524

Sample Narrative:
L1194169-07 WG1436524: Endpoint pH 4.5

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Ammonia Nitrogen	ND		0.100	1	03/03/2020 12:49	WG1435944

Wet Chemistry by Method 410.4

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
COD	ND		10.0	1	03/01/2020 12:23	WG1436347

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		1.00	1	02/28/2020 21:24	WG1435898
Chloride	62.0		1.00	1	02/28/2020 21:24	WG1435898
Fluoride	ND		0.100	1	02/28/2020 21:24	WG1435898
Nitrate	5.18		0.100	1	02/28/2020 21:24	WG1435898
Sulfate	ND		5.00	1	02/28/2020 21:24	WG1435898

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	03/03/2020 09:43	WG1436731

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	ND		0.200	1	03/03/2020 21:07	WG1436814

Metals (ICPMS) by Method 6020A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	0.602		0.100	1	03/02/2020 21:28	WG1436122
Antimony	ND		0.00200	1	03/02/2020 21:28	WG1436122
Arsenic	ND		0.00200	1	03/02/2020 21:28	WG1436122
Barium	0.0453		0.00500	1	03/02/2020 21:28	WG1436122
Beryllium	ND		0.00200	1	03/02/2020 21:28	WG1436122
Cadmium	ND		0.00100	1	03/02/2020 21:28	WG1436122
Calcium	21.3		1.00	1	03/02/2020 21:28	WG1436122
Chromium	0.00234	B	0.00200	1	03/02/2020 21:28	WG1436122
Cobalt	ND		0.00200	1	03/02/2020 21:28	WG1436122
Copper	ND		0.00500	1	03/02/2020 21:28	WG1436122

Metals (ICPMS) by Method 6020A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Iron	0.680		0.100	1	03/02/2020 21:28	WG1436122
Lead	ND		0.00200	1	03/02/2020 21:28	WG1436122
Magnesium	7.07		1.00	1	03/02/2020 21:28	WG1436122
Manganese	0.0145		0.00500	1	03/02/2020 21:28	WG1436122
Nickel	ND		0.00200	1	03/02/2020 21:28	WG1436122
Potassium	1.92		1.00	1	03/02/2020 21:28	WG1436122
Selenium	ND		0.00200	1	03/02/2020 21:28	WG1436122
Silver	ND		0.00200	1	03/02/2020 21:28	WG1436122
Sodium	12.6		1.00	1	03/02/2020 21:28	WG1436122
Thallium	ND		0.00200	1	03/02/2020 21:28	WG1436122
Vanadium	ND		0.00500	1	03/02/2020 21:28	WG1436122
Zinc	ND		0.0250	1	03/02/2020 21:28	WG1436122

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Acetone	ND		0.0500	1	03/02/2020 14:12	WG1436755
Acrylonitrile	ND		0.0100	1	03/02/2020 14:12	WG1436755
Benzene	ND		0.00100	1	03/02/2020 14:12	WG1436755
Bromochloromethane	ND		0.00100	1	03/02/2020 14:12	WG1436755
Bromodichloromethane	ND		0.00100	1	03/02/2020 14:12	WG1436755
Bromoform	ND		0.00100	1	03/02/2020 14:12	WG1436755
Bromomethane	ND		0.00500	1	03/02/2020 14:12	WG1436755
Carbon disulfide	ND		0.00100	1	03/02/2020 14:12	WG1436755
Carbon tetrachloride	ND		0.00100	1	03/02/2020 14:12	WG1436755
Chlorobenzene	ND		0.00100	1	03/02/2020 14:12	WG1436755
Chlorodibromomethane	ND		0.00100	1	03/02/2020 14:12	WG1436755
Chloroethane	ND		0.00500	1	03/02/2020 14:12	WG1436755
Chloroform	ND		0.00500	1	03/02/2020 14:12	WG1436755
Chloromethane	ND		0.00250	1	03/02/2020 14:12	WG1436755
Dibromomethane	ND		0.00100	1	03/02/2020 14:12	WG1436755
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	03/02/2020 14:12	WG1436755
1,2-Dibromoethane	ND		0.00100	1	03/02/2020 14:12	WG1436755
1,2-Dichlorobenzene	ND		0.00100	1	03/02/2020 14:12	WG1436755
1,4-Dichlorobenzene	ND		0.00100	1	03/02/2020 14:12	WG1436755
trans-1,4-Dichloro-2-butene	ND		0.00250	1	03/02/2020 14:12	WG1436755
1,1-Dichloroethane	ND		0.00100	1	03/02/2020 14:12	WG1436755
1,2-Dichloroethane	ND		0.00100	1	03/02/2020 14:12	WG1436755
1,1-Dichloroethene	ND		0.00100	1	03/02/2020 14:12	WG1436755
cis-1,2-Dichloroethene	ND		0.00100	1	03/02/2020 14:12	WG1436755
trans-1,2-Dichloroethene	ND		0.00100	1	03/02/2020 14:12	WG1436755
1,2-Dichloropropane	ND		0.00100	1	03/02/2020 14:12	WG1436755
cis-1,3-Dichloropropene	ND		0.00100	1	03/02/2020 14:12	WG1436755
trans-1,3-Dichloropropene	ND		0.00100	1	03/02/2020 14:12	WG1436755
Ethylbenzene	ND		0.00100	1	03/02/2020 14:12	WG1436755
2-Hexanone	ND		0.0100	1	03/02/2020 14:12	WG1436755
Iodomethane	ND		0.0100	1	03/02/2020 14:12	WG1436755
2-Butanone (MEK)	ND		0.0100	1	03/02/2020 14:12	WG1436755
Methylene Chloride	ND		0.00500	1	03/02/2020 14:12	WG1436755
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	03/02/2020 14:12	WG1436755
Styrene	ND		0.00100	1	03/02/2020 14:12	WG1436755
1,1,1,2-Tetrachloroethane	ND		0.00100	1	03/02/2020 14:12	WG1436755
1,1,2,2-Tetrachloroethane	ND		0.00100	1	03/02/2020 14:12	WG1436755
Tetrachloroethene	ND		0.00100	1	03/02/2020 14:12	WG1436755
Toluene	ND		0.00100	1	03/02/2020 14:12	WG1436755
1,1,1-Trichloroethane	ND		0.00100	1	03/02/2020 14:12	WG1436755

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
1,1,2-Trichloroethane	ND		0.00100	1	03/02/2020 14:12	WG1436755
Trichloroethene	ND		0.00100	1	03/02/2020 14:12	WG1436755
Trichlorofluoromethane	ND		0.00500	1	03/02/2020 14:12	WG1436755
1,2,3-Trichloropropane	ND		0.00250	1	03/02/2020 14:12	WG1436755
Vinyl acetate	ND		0.0100	1	03/02/2020 14:12	WG1436755
Vinyl chloride	ND		0.00100	1	03/02/2020 14:12	WG1436755
Xylenes, Total	ND		0.00300	1	03/02/2020 14:12	WG1436755
(S) Toluene-d8	*104*		*80.0-120*		*03/02/2020 14:12*	WG1436755
(S) 4-Bromofluorobenzene	*96.9*		*77.0-126*		*03/02/2020 14:12*	WG1436755
(S) 1,2-Dichloroethane-d4	*105*		*70.0-130*		*03/02/2020 14:12*	WG1436755

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000100	1	03/03/2020 17:50	WG1436627
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	03/03/2020 17:50	WG1436627

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

Wet Chemistry by Method 130.1

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Hardness (colorimetric) as CaCO3	76.4		30.0	1	03/04/2020 12:05	WG1435790

Wet Chemistry by Method 2320 B-2011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Alkalinity	ND		20.0	1	03/04/2020 20:54	WG1436524

Sample Narrative:
L1194169-08 WG1436524: Endpoint pH 4.5

Wet Chemistry by Method 350.1

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ammonia Nitrogen	ND		0.100	1	03/03/2020 12:52	WG1435944

Wet Chemistry by Method 410.4

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
COD	ND		10.0	1	03/01/2020 12:23	WG1436347

Wet Chemistry by Method 9056A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Bromide	ND		1.00	1	02/28/2020 21:42	WG1435898
Chloride	18.2		1.00	1	02/28/2020 21:42	WG1435898
Fluoride	0.153		0.100	1	02/28/2020 21:42	WG1435898
Nitrate	1.06		0.100	1	02/28/2020 21:42	WG1435898
Sulfate	62.2		5.00	1	02/28/2020 21:42	WG1435898

Mercury by Method 7470A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Mercury	ND		0.000200	1	03/03/2020 09:45	WG1436731

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Boron	ND		0.200	1	03/03/2020 21:10	WG1436814

Metals (ICPMS) by Method 6020A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Aluminum	0.230		0.100	1	03/02/2020 21:31	WG1436122
Antimony	ND		0.00200	1	03/02/2020 21:31	WG1436122
Arsenic	ND		0.00200	1	03/02/2020 21:31	WG1436122
Barium	0.0451		0.00500	1	03/02/2020 21:31	WG1436122
Beryllium	ND		0.00200	1	03/02/2020 21:31	WG1436122
Cadmium	0.00231		0.00100	1	03/02/2020 21:31	WG1436122
Calcium	18.6		1.00	1	03/02/2020 21:31	WG1436122
Chromium	ND		0.00200	1	03/02/2020 21:31	WG1436122
Cobalt	ND		0.00200	1	03/02/2020 21:31	WG1436122
Copper	ND		0.00500	1	03/02/2020 21:31	WG1436122

Metals (ICPMS) by Method 6020A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Iron	0.100		0.100	1	03/02/2020 21:31	WG1436122
Lead	ND		0.00200	1	03/02/2020 21:31	WG1436122
Magnesium	6.82		1.00	1	03/02/2020 21:31	WG1436122
Manganese	0.189		0.00500	1	03/02/2020 21:31	WG1436122
Nickel	0.00327		0.00200	1	03/02/2020 21:31	WG1436122
Potassium	3.68		1.00	1	03/02/2020 21:31	WG1436122
Selenium	ND		0.00200	1	03/02/2020 21:31	WG1436122
Silver	ND		0.00200	1	03/02/2020 21:31	WG1436122
Sodium	10.6		1.00	1	03/02/2020 21:31	WG1436122
Thallium	ND		0.00200	1	03/02/2020 21:31	WG1436122
Vanadium	ND		0.00500	1	03/02/2020 21:31	WG1436122
Zinc	ND		0.0250	1	03/02/2020 21:31	WG1436122

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Acetone	ND		0.0500	1	03/02/2020 14:31	WG1436755
Acrylonitrile	ND		0.0100	1	03/02/2020 14:31	WG1436755
Benzene	ND		0.00100	1	03/02/2020 14:31	WG1436755
Bromochloromethane	ND		0.00100	1	03/02/2020 14:31	WG1436755
Bromodichloromethane	ND		0.00100	1	03/02/2020 14:31	WG1436755
Bromoform	ND		0.00100	1	03/02/2020 14:31	WG1436755
Bromomethane	ND		0.00500	1	03/02/2020 14:31	WG1436755
Carbon disulfide	ND		0.00100	1	03/02/2020 14:31	WG1436755
Carbon tetrachloride	ND		0.00100	1	03/02/2020 14:31	WG1436755
Chlorobenzene	ND		0.00100	1	03/02/2020 14:31	WG1436755
Chlorodibromomethane	ND		0.00100	1	03/02/2020 14:31	WG1436755
Chloroethane	ND		0.00500	1	03/02/2020 14:31	WG1436755
Chloroform	ND		0.00500	1	03/02/2020 14:31	WG1436755
Chloromethane	ND		0.00250	1	03/02/2020 14:31	WG1436755
Dibromomethane	ND		0.00100	1	03/02/2020 14:31	WG1436755
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	03/02/2020 14:31	WG1436755
1,2-Dibromoethane	ND		0.00100	1	03/02/2020 14:31	WG1436755
1,2-Dichlorobenzene	ND		0.00100	1	03/02/2020 14:31	WG1436755
1,4-Dichlorobenzene	ND		0.00100	1	03/02/2020 14:31	WG1436755
trans-1,4-Dichloro-2-butene	ND		0.00250	1	03/02/2020 14:31	WG1436755
1,1-Dichloroethane	ND		0.00100	1	03/02/2020 14:31	WG1436755
1,2-Dichloroethane	ND		0.00100	1	03/02/2020 14:31	WG1436755
1,1-Dichloroethene	ND		0.00100	1	03/02/2020 14:31	WG1436755
cis-1,2-Dichloroethene	ND		0.00100	1	03/02/2020 14:31	WG1436755
trans-1,2-Dichloroethene	ND		0.00100	1	03/02/2020 14:31	WG1436755
1,2-Dichloropropane	ND		0.00100	1	03/02/2020 14:31	WG1436755
cis-1,3-Dichloropropene	ND		0.00100	1	03/02/2020 14:31	WG1436755
trans-1,3-Dichloropropene	ND		0.00100	1	03/02/2020 14:31	WG1436755
Ethylbenzene	ND		0.00100	1	03/02/2020 14:31	WG1436755
2-Hexanone	ND		0.0100	1	03/02/2020 14:31	WG1436755
Iodomethane	ND		0.0100	1	03/02/2020 14:31	WG1436755
2-Butanone (MEK)	ND		0.0100	1	03/02/2020 14:31	WG1436755
Methylene Chloride	ND		0.00500	1	03/02/2020 14:31	WG1436755
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	03/02/2020 14:31	WG1436755
Styrene	ND		0.00100	1	03/02/2020 14:31	WG1436755
1,1,1,2-Tetrachloroethane	ND		0.00100	1	03/02/2020 14:31	WG1436755
1,1,2,2-Tetrachloroethane	ND		0.00100	1	03/02/2020 14:31	WG1436755
Tetrachloroethene	ND		0.00100	1	03/02/2020 14:31	WG1436755
Toluene	ND		0.00100	1	03/02/2020 14:31	WG1436755
1,1,1-Trichloroethane	ND		0.00100	1	03/02/2020 14:31	WG1436755

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
1,1,2-Trichloroethane	ND		0.00100	1	03/02/2020 14:31	WG1436755
Trichloroethene	ND		0.00100	1	03/02/2020 14:31	WG1436755
Trichlorofluoromethane	ND		0.00500	1	03/02/2020 14:31	WG1436755
1,2,3-Trichloropropane	ND		0.00250	1	03/02/2020 14:31	WG1436755
Vinyl acetate	ND		0.0100	1	03/02/2020 14:31	WG1436755
Vinyl chloride	ND		0.00100	1	03/02/2020 14:31	WG1436755
Xylenes, Total	ND		0.00300	1	03/02/2020 14:31	WG1436755
(S) Toluene-d8	*103*		*80.0-120*		*03/02/2020 14:31*	WG1436755
(S) 4-Bromofluorobenzene	*97.8*		*77.0-126*		*03/02/2020 14:31*	WG1436755
(S) 1,2-Dichloroethane-d4	*103*		*70.0-130*		*03/02/2020 14:31*	WG1436755

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000100	1	03/03/2020 18:02	WG1436627
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	03/03/2020 18:02	WG1436627

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

Wet Chemistry by Method 130.1

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Hardness (colorimetric) as CaCO3	ND		30.0	1	03/04/2020 12:06	WG1435790

Wet Chemistry by Method 2320 B-2011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Alkalinity	ND		20.0	1	03/04/2020 21:00	WG1436524

Sample Narrative:
L1194169-09 WG1436524: Endpoint pH 4.5

Wet Chemistry by Method 350.1

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ammonia Nitrogen	ND		0.100	1	03/03/2020 12:55	WG1435944

Wet Chemistry by Method 410.4

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
COD	13.8		10.0	1	03/01/2020 12:23	WG1436347

Wet Chemistry by Method 9056A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Bromide	ND		1.00	1	02/28/2020 22:18	WG1435898
Chloride	ND		1.00	1	02/28/2020 22:18	WG1435898
Fluoride	ND		0.100	1	02/28/2020 22:18	WG1435898
Nitrate	ND		0.100	1	02/28/2020 22:18	WG1435898
Sulfate	ND		5.00	1	02/28/2020 22:18	WG1435898

Mercury by Method 7470A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Mercury	ND		0.000200	1	03/03/2020 09:47	WG1436731

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Boron	ND		0.200	1	03/03/2020 22:53	WG1435913

Metals (ICPMS) by Method 6020A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Aluminum	ND		0.100	1	03/02/2020 21:34	WG1436122
Antimony	ND		0.00200	1	03/02/2020 21:34	WG1436122
Arsenic	ND		0.00200	1	03/02/2020 21:34	WG1436122
Barium	ND		0.00500	1	03/02/2020 21:34	WG1436122
Beryllium	ND		0.00200	1	03/02/2020 21:34	WG1436122
Cadmium	ND		0.00100	1	03/02/2020 21:34	WG1436122
Calcium	ND		1.00	1	03/02/2020 21:34	WG1436122
Chromium	ND		0.00200	1	03/02/2020 21:34	WG1436122
Cobalt	ND		0.00200	1	03/02/2020 21:34	WG1436122
Copper	ND		0.00500	1	03/02/2020 21:34	WG1436122

Metals (ICPMS) by Method 6020A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Iron	ND		0.100	1	03/02/2020 21:34	WG1436122
Lead	ND		0.00200	1	03/02/2020 21:34	WG1436122
Magnesium	ND		1.00	1	03/02/2020 21:34	WG1436122
Manganese	ND		0.00500	1	03/02/2020 21:34	WG1436122
Nickel	ND		0.00200	1	03/02/2020 21:34	WG1436122
Potassium	ND		1.00	1	03/02/2020 21:34	WG1436122
Selenium	ND		0.00200	1	03/02/2020 21:34	WG1436122
Silver	ND		0.00200	1	03/02/2020 21:34	WG1436122
Sodium	ND		1.00	1	03/02/2020 21:34	WG1436122
Thallium	ND		0.00200	1	03/02/2020 21:34	WG1436122
Vanadium	ND		0.00500	1	03/02/2020 21:34	WG1436122
Zinc	ND		0.0250	1	03/02/2020 21:34	WG1436122

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Acetone	ND	J3 J4	0.0500	1	03/02/2020 22:40	WG1437026
Acrylonitrile	ND		0.0100	1	03/02/2020 22:40	WG1437026
Benzene	ND		0.00100	1	03/02/2020 22:40	WG1437026
Bromochloromethane	ND		0.00100	1	03/02/2020 22:40	WG1437026
Bromodichloromethane	ND		0.00100	1	03/02/2020 22:40	WG1437026
Bromoform	ND		0.00100	1	03/02/2020 22:40	WG1437026
Bromomethane	ND		0.00500	1	03/02/2020 22:40	WG1437026
Carbon disulfide	ND		0.00100	1	03/02/2020 22:40	WG1437026
Carbon tetrachloride	ND		0.00100	1	03/02/2020 22:40	WG1437026
Chlorobenzene	ND		0.00100	1	03/02/2020 22:40	WG1437026
Chlorodibromomethane	ND		0.00100	1	03/02/2020 22:40	WG1437026
Chloroethane	ND		0.00500	1	03/02/2020 22:40	WG1437026
Chloroform	ND		0.00500	1	03/02/2020 22:40	WG1437026
Chloromethane	ND		0.00250	1	03/02/2020 22:40	WG1437026
Dibromomethane	ND		0.00100	1	03/02/2020 22:40	WG1437026
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	03/02/2020 22:40	WG1437026
1,2-Dibromoethane	ND		0.00100	1	03/02/2020 22:40	WG1437026
1,2-Dichlorobenzene	ND		0.00100	1	03/02/2020 22:40	WG1437026
1,4-Dichlorobenzene	ND		0.00100	1	03/02/2020 22:40	WG1437026
trans-1,4-Dichloro-2-butene	ND		0.00250	1	03/02/2020 22:40	WG1437026
1,1-Dichloroethane	ND		0.00100	1	03/02/2020 22:40	WG1437026
1,2-Dichloroethane	ND		0.00100	1	03/02/2020 22:40	WG1437026
1,1-Dichloroethene	ND		0.00100	1	03/02/2020 22:40	WG1437026
cis-1,2-Dichloroethene	ND		0.00100	1	03/02/2020 22:40	WG1437026
trans-1,2-Dichloroethene	ND		0.00100	1	03/02/2020 22:40	WG1437026
1,2-Dichloropropane	ND		0.00100	1	03/02/2020 22:40	WG1437026
cis-1,3-Dichloropropene	ND		0.00100	1	03/02/2020 22:40	WG1437026
trans-1,3-Dichloropropene	ND		0.00100	1	03/02/2020 22:40	WG1437026
Ethylbenzene	ND		0.00100	1	03/02/2020 22:40	WG1437026
2-Hexanone	ND		0.0100	1	03/02/2020 22:40	WG1437026
Iodomethane	ND		0.0100	1	03/02/2020 22:40	WG1437026
2-Butanone (MEK)	ND		0.0100	1	03/02/2020 22:40	WG1437026
Methylene Chloride	ND		0.00500	1	03/02/2020 22:40	WG1437026
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	03/02/2020 22:40	WG1437026
Styrene	ND		0.00100	1	03/02/2020 22:40	WG1437026
1,1,1,2-Tetrachloroethane	ND		0.00100	1	03/02/2020 22:40	WG1437026
1,1,2,2-Tetrachloroethane	ND		0.00100	1	03/02/2020 22:40	WG1437026
Tetrachloroethene	ND		0.00100	1	03/02/2020 22:40	WG1437026
Toluene	ND		0.00100	1	03/02/2020 22:40	WG1437026
1,1,1-Trichloroethane	ND	J4	0.00100	1	03/02/2020 22:40	WG1437026

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
1,1,2-Trichloroethane	ND		0.00100	1	03/02/2020 22:40	WG1437026
Trichloroethene	ND		0.00100	1	03/02/2020 22:40	WG1437026
Trichlorofluoromethane	ND	J3 J4	0.00500	1	03/02/2020 22:40	WG1437026
1,2,3-Trichloropropane	ND		0.00250	1	03/02/2020 22:40	WG1437026
Vinyl acetate	ND		0.0100	1	03/02/2020 22:40	WG1437026
Vinyl chloride	ND		0.00100	1	03/02/2020 22:40	WG1437026
Xylenes, Total	ND		0.00300	1	03/02/2020 22:40	WG1437026
(S) Toluene-d8	*97.1*		*80.0-120*		*03/02/2020 22:40*	WG1437026
(S) 4-Bromofluorobenzene	*101*		*77.0-126*		*03/02/2020 22:40*	WG1437026
(S) 1,2-Dichloroethane-d4	*117*		*70.0-130*		*03/02/2020 22:40*	WG1437026

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000100	1	03/03/2020 18:14	WG1436627
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	03/03/2020 18:14	WG1436627

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Acetone	ND	J3 J4	0.0500	1	03/02/2020 22:59	WG1437026
Acrylonitrile	ND		0.0100	1	03/02/2020 22:59	WG1437026
Benzene	ND		0.00100	1	03/02/2020 22:59	WG1437026
Bromochloromethane	ND		0.00100	1	03/02/2020 22:59	WG1437026
Bromodichloromethane	ND		0.00100	1	03/02/2020 22:59	WG1437026
Bromoform	ND		0.00100	1	03/02/2020 22:59	WG1437026
Bromomethane	ND		0.00500	1	03/02/2020 22:59	WG1437026
Carbon disulfide	ND		0.00100	1	03/02/2020 22:59	WG1437026
Carbon tetrachloride	ND		0.00100	1	03/02/2020 22:59	WG1437026
Chlorobenzene	ND		0.00100	1	03/02/2020 22:59	WG1437026
Chlorodibromomethane	ND		0.00100	1	03/02/2020 22:59	WG1437026
Chloroethane	ND		0.00500	1	03/02/2020 22:59	WG1437026
Chloroform	ND		0.00500	1	03/02/2020 22:59	WG1437026
Chloromethane	ND		0.00250	1	03/02/2020 22:59	WG1437026
Dibromomethane	ND		0.00100	1	03/02/2020 22:59	WG1437026
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	03/02/2020 22:59	WG1437026
1,2-Dibromoethane	ND		0.00100	1	03/02/2020 22:59	WG1437026
1,2-Dichlorobenzene	ND		0.00100	1	03/02/2020 22:59	WG1437026
1,4-Dichlorobenzene	ND		0.00100	1	03/02/2020 22:59	WG1437026
trans-1,4-Dichloro-2-butene	ND		0.00250	1	03/02/2020 22:59	WG1437026
1,1-Dichloroethane	ND		0.00100	1	03/02/2020 22:59	WG1437026
1,2-Dichloroethane	ND		0.00100	1	03/02/2020 22:59	WG1437026
1,1-Dichloroethene	ND		0.00100	1	03/02/2020 22:59	WG1437026
cis-1,2-Dichloroethene	ND		0.00100	1	03/02/2020 22:59	WG1437026
trans-1,2-Dichloroethene	ND		0.00100	1	03/02/2020 22:59	WG1437026
1,2-Dichloropropane	ND		0.00100	1	03/02/2020 22:59	WG1437026
cis-1,3-Dichloropropene	ND		0.00100	1	03/02/2020 22:59	WG1437026
trans-1,3-Dichloropropene	ND		0.00100	1	03/02/2020 22:59	WG1437026
Ethylbenzene	ND		0.00100	1	03/02/2020 22:59	WG1437026
2-Hexanone	ND		0.0100	1	03/02/2020 22:59	WG1437026
Iodomethane	ND		0.0100	1	03/02/2020 22:59	WG1437026
2-Butanone (MEK)	ND		0.0100	1	03/02/2020 22:59	WG1437026
Methylene Chloride	ND		0.00500	1	03/02/2020 22:59	WG1437026
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	03/02/2020 22:59	WG1437026
Styrene	ND		0.00100	1	03/02/2020 22:59	WG1437026
1,1,1,2-Tetrachloroethane	ND		0.00100	1	03/02/2020 22:59	WG1437026
1,1,2,2-Tetrachloroethane	ND		0.00100	1	03/02/2020 22:59	WG1437026
Tetrachloroethene	ND		0.00100	1	03/02/2020 22:59	WG1437026
Toluene	ND		0.00100	1	03/02/2020 22:59	WG1437026
1,1,1-Trichloroethane	ND	J4	0.00100	1	03/02/2020 22:59	WG1437026
1,1,2-Trichloroethane	ND		0.00100	1	03/02/2020 22:59	WG1437026
Trichloroethene	ND		0.00100	1	03/02/2020 22:59	WG1437026
Trichlorofluoromethane	ND	J3 J4	0.00500	1	03/02/2020 22:59	WG1437026
1,2,3-Trichloropropane	ND		0.00250	1	03/02/2020 22:59	WG1437026
Vinyl acetate	ND		0.0100	1	03/02/2020 22:59	WG1437026
Vinyl chloride	ND		0.00100	1	03/02/2020 22:59	WG1437026
Xylenes, Total	ND		0.00300	1	03/02/2020 22:59	WG1437026
(S) Toluene-d8	*98.0*		*80.0-120*		*03/02/2020 22:59*	WG1437026
(S) 4-Bromofluorobenzene	*101*		*77.0-126*		*03/02/2020 22:59*	WG1437026
(S) 1,2-Dichloroethane-d4	*116*		*70.0-130*		*03/02/2020 22:59*	WG1437026

Method Blank (MB)

(MB) R3505206-1 03/04/20 11:42

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Hardness (colorimetric) as CaCO3	6.36	J	1.43	30.0

L1194026-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1194026-01 03/04/20 11:53 • (DUP) R3505206-5 03/04/20 11:53

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hardness (colorimetric) as CaCO3	185	186	1	0.539		20

L1194075-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1194075-01 03/04/20 11:56 • (DUP) R3505206-6 03/04/20 11:57

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hardness (colorimetric) as CaCO3	46.8	49.7	1	6.01		20

Laboratory Control Sample (LCS)

(LCS) R3505206-2 03/04/20 11:43

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Hardness (colorimetric) as CaCO3	100	101	101	85.0-115	

L1193971-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1193971-01 03/04/20 11:47 • (MS) R3505206-3 03/04/20 11:48 • (MSD) R3505206-4 03/04/20 11:48

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Hardness (colorimetric) as CaCO3	100	128	205	199	77.0	71.0	1	80.0-120	E J6	J6	2.97	20

Method Blank (MB)

(MB) R3505483-1 03/04/20 19:36

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Alkalinity	4.23	J	2.71	20.0

Sample Narrative:

BLANK: Endpoint pH 4.5

L1194253-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1194253-03 03/04/20 19:45 • (DUP) R3505483-2 03/04/20 19:53

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Alkalinity	61.5	61.6	1	0.167		20

Sample Narrative:

OS: Endpoint pH 4.5

DUP: Endpoint pH 4.5

L1194223-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1194223-01 03/04/20 21:08 • (DUP) R3505483-4 03/04/20 21:16

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Alkalinity	169	156	1	7.55		20

Sample Narrative:

OS: Endpoint pH 4.5

DUP: Endpoint pH 4.5

Laboratory Control Sample (LCS)

(LCS) R3505483-3 03/04/20 20:47

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Alkalinity	100	102	102	85.0-115	

Sample Narrative:

LCS: Endpoint pH 4.5

Method Blank (MB)

(MB) R3504919-1 03/03/20 12:19

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Ammonia Nitrogen	U		0.0317	0.100

L1194080-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1194080-01 03/03/20 12:27 • (DUP) R3504919-3 03/03/20 12:29

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Ammonia Nitrogen	2.38	2.38	1	0.0420		10

L1194169-07 Original Sample (OS) • Duplicate (DUP)

(OS) L1194169-07 03/03/20 12:49 • (DUP) R3504919-6 03/03/20 12:50

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Ammonia Nitrogen	ND	0.000	1	0.000		10

Laboratory Control Sample (LCS)

(LCS) R3504919-2 03/03/20 12:20

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Ammonia Nitrogen	7.50	7.74	103	90.0-110	

L1194169-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1194169-01 03/03/20 12:30 • (MS) R3504919-4 03/03/20 12:32 • (MSD) R3504919-5 03/03/20 12:34

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Ammonia Nitrogen	5.00	0.140	5.33	5.50	104	107	1	90.0-110			3.18	10

L1194169-08 Original Sample (OS) • Matrix Spike (MS)

(OS) L1194169-08 03/03/20 12:52 • (MS) R3504919-7 03/03/20 12:54

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Ammonia Nitrogen	5.00	ND	5.10	102	1	90.0-110	

Method Blank (MB)

(MB) R3504275-1 03/01/20 12:21

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
COD	U		3.00	10.0

L1194169-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1194169-01 03/01/20 12:22 • (DUP) R3504275-3 03/01/20 12:22

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
COD	ND	0.000	1	0.000		20

L1194387-10 Original Sample (OS) • Duplicate (DUP)

(OS) L1194387-10 03/01/20 12:28 • (DUP) R3504275-6 03/01/20 12:29

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
COD	U	0.000	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3504275-2 03/01/20 12:22

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
COD	222	219	98.5	90.0-110	

L1194169-09 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1194169-09 03/01/20 12:23 • (MS) R3504275-4 03/01/20 12:23 • (MSD) R3504275-5 03/01/20 12:24

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
COD	400	13.8	446	442	108	107	1	80.0-120			0.793	20

Method Blank (MB)

(MB) R3504117-1 02/28/20 09:32

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Bromide	U		0.0790	1.00
Chloride	U		0.0519	1.00
Fluoride	U		0.00990	0.100
Nitrate	U		0.0227	0.100
Sulfate	U		0.0774	5.00

L1194169-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1194169-03 02/28/20 18:43 • (DUP) R3504117-3 02/28/20 19:01

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Bromide	ND	0.000	1	0.000		15
Chloride	7.87	7.79	1	1.05		15
Fluoride	ND	0.0356	1	0.000	J	15
Nitrate	0.611	0.677	1	10.2		15
Sulfate	ND	0.543	1	2.04	J	15

Laboratory Control Sample (LCS)

(LCS) R3504117-2 02/28/20 09:50

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Bromide	40.0	39.3	98.3	80.0-120	
Chloride	40.0	39.0	97.5	80.0-120	
Fluoride	8.00	7.86	98.3	80.0-120	
Nitrate	8.00	7.89	98.6	80.0-120	
Sulfate	40.0	39.4	98.6	80.0-120	

L1194169-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1194169-06 02/28/20 20:30 • (MS) R3504117-4 02/28/20 20:48 • (MSD) R3504117-5 02/28/20 21:06

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Bromide	50.0	ND	48.9	49.0	97.9	97.9	1	80.0-120			0.0572	15
Chloride	50.0	31.9	80.0	79.9	96.2	96.1	1	80.0-120			0.0565	15
Fluoride	5.00	ND	5.00	5.01	99.8	99.9	1	80.0-120			0.0619	15
Nitrate	5.00	0.898	5.83	5.85	98.6	98.9	1	80.0-120			0.317	15
Sulfate	50.0	ND	49.4	49.3	98.8	98.6	1	80.0-120			0.173	15

Method Blank (MB)

(MB) R3504838-1 03/03/20 08:58

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Mercury	U		0.0000490	0.000200

Laboratory Control Sample (LCS)

(LCS) R3504838-2 03/03/20 09:00

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Mercury	0.00300	0.00311	104	80.0-120	

L1194151-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1194151-04 03/03/20 09:02 • (MS) R3504838-3 03/03/20 09:04 • (MSD) R3504838-4 03/03/20 09:06

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Mercury	0.00300	U	0.00207	0.00167	69.1	55.5	1	75.0-125	J6	J3 J6	21.8	20

Method Blank (MB)

(MB) R3504868-1 03/03/20 09:50

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Boron	U		0.0126	0.200

Laboratory Control Sample (LCS)

(LCS) R3504868-2 03/03/20 09:53

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Boron	1.00	0.979	97.9	80.0-120	

L1194151-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1194151-04 03/03/20 09:56 • (MS) R3504868-4 03/03/20 10:01 • (MSD) R3504868-5 03/03/20 10:04

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Boron	1.00	0.0323	0.976	0.974	94.4	94.2	1	75.0-125			0.200	20

Method Blank (MB)

(MB) R3505053-1 03/03/20 22:37

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Boron	U		0.0126	0.200

Laboratory Control Sample (LCS)

(LCS) R3505053-2 03/03/20 22:40

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Boron	1.00	0.951	95.1	80.0-120	

L1194178-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1194178-04 03/03/20 22:42 • (MS) R3505053-4 03/03/20 22:48 • (MSD) R3505053-5 03/03/20 22:50

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Boron	1.00	0.0340	1.01	1.03	97.1	99.5	1	75.0-125			2.33	20

Method Blank (MB)

(MB) R3505052-1 03/03/20 20:51

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Boron	U		0.0126	0.200

Laboratory Control Sample (LCS)

(LCS) R3505052-2 03/03/20 20:53

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Boron	1.00	0.931	93.1	80.0-120	

L1194709-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1194709-04 03/03/20 20:56 • (MS) R3505052-4 03/03/20 21:02 • (MSD) R3505052-5 03/03/20 21:04

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Boron	1.00	0.842	1.80	1.79	96.1	94.5	1	75.0-125			0.875	20

Method Blank (MB)

(MB) R3504686-1 03/02/20 20:37

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Aluminum	U		0.00515	0.100
Antimony	U		0.000754	0.00200
Arsenic	U		0.000250	0.00200
Barium	U		0.000360	0.00500
Beryllium	U		0.000120	0.00200
Cadmium	U		0.000160	0.00100
Calcium	0.176	J	0.0460	1.00
Chromium	0.00106	J	0.000540	0.00200
Copper	U		0.000520	0.00500
Cobalt	U		0.000260	0.00200
Iron	U		0.0150	0.100
Lead	0.000262	J	0.000240	0.00200
Magnesium	U		0.100	1.00
Manganese	0.000401	J	0.000250	0.00500
Nickel	U		0.000350	0.00200
Potassium	0.125	J	0.0370	1.00
Selenium	U		0.000380	0.00200
Silver	U		0.000310	0.00200
Sodium	U		0.110	1.00
Thallium	U		0.000190	0.00200
Vanadium	0.000243	J	0.000180	0.00500
Zinc	U		0.00256	0.0250

Laboratory Control Sample (LCS)

(LCS) R3504686-2 03/02/20 20:40

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Aluminum	5.00	4.98	99.7	80.0-120	
Antimony	0.0500	0.0518	104	80.0-120	
Arsenic	0.0500	0.0485	96.9	80.0-120	
Barium	0.0500	0.0511	102	80.0-120	
Beryllium	0.0500	0.0464	92.7	80.0-120	
Cadmium	0.0500	0.0519	104	80.0-120	
Calcium	5.00	5.10	102	80.0-120	
Chromium	0.0500	0.0509	102	80.0-120	
Copper	0.0500	0.0461	92.2	80.0-120	
Cobalt	0.0500	0.0509	102	80.0-120	
Iron	5.00	5.09	102	80.0-120	

Laboratory Control Sample (LCS)

(LCS) R3504686-2 03/02/20 20:40

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Lead	0.0500	0.0496	99.1	80.0-120	
Magnesium	5.00	5.16	103	80.0-120	
Manganese	0.0500	0.0498	99.6	80.0-120	
Nickel	0.0500	0.0506	101	80.0-120	
Potassium	5.00	5.11	102	80.0-120	
Selenium	0.0500	0.0533	107	80.0-120	
Silver	0.0500	0.0503	101	80.0-120	
Sodium	5.00	5.11	102	80.0-120	
Thallium	0.0500	0.0490	97.9	80.0-120	
Vanadium	0.0500	0.0500	100	80.0-120	
Zinc	0.0500	0.0484	96.7	80.0-120	

L1194169-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1194169-01 03/02/20 20:44 • (MS) R3504686-4 03/02/20 20:51 • (MSD) R3504686-5 03/02/20 20:55

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Aluminum	5.00	ND	4.93	4.99	97.9	99.0	1	75.0-125			1.11	20
Antimony	0.0500	ND	0.0499	0.0509	99.8	102	1	75.0-125			1.98	20
Arsenic	0.0500	0.00807	0.0583	0.0543	101	92.4	1	75.0-125			7.21	20
Barium	0.0500	0.0243	0.0719	0.0751	95.1	101	1	75.0-125			4.35	20
Beryllium	0.0500	ND	0.0473	0.0471	94.6	94.3	1	75.0-125			0.289	20
Cadmium	0.0500	ND	0.0517	0.0522	103	104	1	75.0-125			0.919	20
Calcium	5.00	6.06	10.9	10.9	96.8	97.4	1	75.0-125			0.277	20
Chromium	0.0500	ND	0.0532	0.0485	106	97.0	1	75.0-125			9.16	20
Copper	0.0500	ND	0.0476	0.0483	91.7	93.1	1	75.0-125			1.48	20
Cobalt	0.0500	0.0744	0.130	0.121	111	92.4	1	75.0-125			7.25	20
Potassium	5.00	1.28	6.20	6.28	98.4	100	1	75.0-125			1.31	20
Iron	5.00	12.3	18.1	16.7	117	89.2	1	75.0-125			8.10	20
Lead	0.0500	ND	0.0508	0.0493	102	98.6	1	75.0-125			2.97	20
Magnesium	5.00	3.52	8.48	8.69	99.3	104	1	75.0-125			2.47	20
Manganese	0.0500	1.21	1.30	1.22	191	27.4	1	75.0-125	V	V	6.50	20
Nickel	0.0500	0.00803	0.0613	0.0562	106	96.3	1	75.0-125			8.72	20
Selenium	0.0500	ND	0.0560	0.0560	112	112	1	75.0-125			0.0188	20
Silver	0.0500	ND	0.0494	0.0498	98.9	99.6	1	75.0-125			0.688	20
Sodium	5.00	3.27	8.17	8.18	98.0	98.3	1	75.0-125			0.147	20
Thallium	0.0500	ND	0.0500	0.0490	99.9	98.0	1	75.0-125			1.96	20
Vanadium	0.0500	ND	0.0520	0.0479	103	95.2	1	75.0-125			8.18	20
Zinc	0.0500	ND	0.0601	0.0574	98.9	93.5	1	75.0-125			4.63	20

Method Blank (MB)

(MB) R3505696-3 02/29/20 20:01

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Acetone	U		0.0100	0.0500
Acrylonitrile	U		0.00187	0.0100
Benzene	U		0.000331	0.00100
Bromodichloromethane	U		0.000380	0.00100
Bromochloromethane	U		0.000520	0.00100
Bromoform	U		0.000469	0.00100
Bromomethane	U		0.000866	0.00500
Carbon disulfide	U		0.000275	0.00100
Carbon tetrachloride	U		0.000379	0.00100
Chlorobenzene	U		0.000348	0.00100
Chlorodibromomethane	U		0.000327	0.00100
Chloroethane	U		0.000453	0.00500
Chloroform	U		0.000324	0.00500
Chloromethane	U		0.000276	0.00250
1,2-Dibromo-3-Chloropropane	U		0.00133	0.00500
1,2-Dibromoethane	U		0.000381	0.00100
Dibromomethane	U		0.000346	0.00100
1,2-Dichlorobenzene	U		0.000349	0.00100
1,4-Dichlorobenzene	U		0.000274	0.00100
trans-1,4-Dichloro-2-butene	U		0.000866	0.00250
1,1-Dichloroethane	U		0.000259	0.00100
1,2-Dichloroethane	U		0.000361	0.00100
1,1-Dichloroethene	U		0.000398	0.00100
cis-1,2-Dichloroethene	U		0.000260	0.00100
trans-1,2-Dichloroethene	U		0.000396	0.00100
1,2-Dichloropropane	U		0.000306	0.00100
cis-1,3-Dichloropropene	U		0.000418	0.00100
trans-1,3-Dichloropropene	U		0.000419	0.00100
Ethylbenzene	U		0.000384	0.00100
2-Hexanone	U		0.00382	0.0100
Iodomethane	U		0.00171	0.0100
2-Butanone (MEK)	U		0.00393	0.0100
Methylene Chloride	U		0.00100	0.00500
4-Methyl-2-pentanone (MIBK)	U		0.00214	0.0100
Styrene	U		0.000307	0.00100
1,1,1,2-Tetrachloroethane	U		0.000385	0.00100
1,1,2,2-Tetrachloroethane	U		0.000130	0.00100
Tetrachloroethene	U		0.000372	0.00100
Toluene	U		0.000412	0.00100
1,1,1-Trichloroethane	U		0.000319	0.00100

Method Blank (MB)

(MB) R3505696-3 02/29/20 20:01

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
1,1,2-Trichloroethane	U		0.000383	0.00100
Trichloroethene	U		0.000398	0.00100
Trichlorofluoromethane	U		0.00120	0.00500
1,2,3-Trichloropropane	U		0.000807	0.00250
Vinyl acetate	U		0.00163	0.0100
Vinyl chloride	U		0.000259	0.00100
Xylenes, Total	U		0.00106	0.00300
(S) Toluene-d8	*100*			*80.0-120*
(S) 4-Bromofluorobenzene	*102*			*77.0-126*
(S) 1,2-Dichloroethane-d4	*110*			*70.0-130*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3505696-1 02/29/20 19:00 • (LCSD) R3505696-2 02/29/20 19:21

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Acetone	0.0250	ND	0.0131	0.000	52.4	19.0-160	J4	J3	200	27
Acrylonitrile	0.0250	0.0235	0.0267	94.0	107	55.0-149			12.7	20
Benzene	0.00500	0.00496	0.00502	99.2	100	70.0-123			1.20	20
Bromodichloromethane	0.00500	0.00509	0.00528	102	106	75.0-120			3.66	20
Bromochloromethane	0.00500	0.00525	0.00554	105	111	76.0-122			5.38	20
Bromoform	0.00500	0.00461	0.00464	92.2	92.8	68.0-132			0.649	20
Bromomethane	0.00500	0.00477	0.00478	95.4	95.6	10.0-160			0.209	25
Carbon disulfide	0.00500	0.00434	0.00443	86.8	88.6	61.0-128			2.05	20
Carbon tetrachloride	0.00500	0.00527	0.00532	105	106	68.0-126			0.944	20
Chlorobenzene	0.00500	0.00456	0.00456	91.2	91.2	80.0-121			0.000	20
Chlorodibromomethane	0.00500	0.00470	0.00483	94.0	96.6	77.0-125			2.73	20
Chloroethane	0.00500	0.00591	0.00607	118	121	47.0-150			2.67	20
Chloroform	0.00500	0.00513	0.00519	103	104	73.0-120			1.16	20
Chloromethane	0.00500	0.00390	0.00411	78.0	82.2	41.0-142			5.24	20
1,2-Dibromo-3-Chloropropane	0.00500	0.00368	0.00398	73.6	79.6	58.0-134			7.83	20
1,2-Dibromoethane	0.00500	0.00462	0.00456	92.4	91.2	80.0-122			1.31	20
Dibromomethane	0.00500	0.00526	0.00531	105	106	80.0-120			0.946	20
1,2-Dichlorobenzene	0.00500	0.00431	0.00437	86.2	87.4	79.0-121			1.38	20
1,4-Dichlorobenzene	0.00500	0.00445	0.00448	89.0	89.6	79.0-120			0.672	20
trans-1,4-Dichloro-2-butene	0.00500	0.00232	0.00253	46.4	50.6	33.0-144			8.66	20
1,1-Dichloroethane	0.00500	0.00481	0.00490	96.2	98.0	70.0-126			1.85	20
1,2-Dichloroethane	0.00500	0.00540	0.00567	108	113	70.0-128			4.88	20
1,1-Dichloroethene	0.00500	0.00465	0.00469	93.0	93.8	71.0-124			0.857	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3505696-1 02/29/20 19:00 • (LCSD) R3505696-2 02/29/20 19:21

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
cis-1,2-Dichloroethene	0.00500	0.00500	0.00516	100	103	73.0-120			3.15	20
trans-1,2-Dichloroethene	0.00500	0.00475	0.00499	95.0	99.8	73.0-120			4.93	20
1,2-Dichloropropane	0.00500	0.00468	0.00482	93.6	96.4	77.0-125			2.95	20
cis-1,3-Dichloropropene	0.00500	0.00494	0.00514	98.8	103	80.0-123			3.97	20
trans-1,3-Dichloropropene	0.00500	0.00461	0.00447	92.2	89.4	78.0-124			3.08	20
Ethylbenzene	0.00500	0.00449	0.00460	89.8	92.0	79.0-123			2.42	20
2-Hexanone	0.0250	0.0217	0.0225	86.8	90.0	67.0-149			3.62	20
Iodomethane	0.0250	0.0255	0.0226	102	90.4	33.0-147			12.1	26
2-Butanone (MEK)	0.0250	0.0246	0.0261	98.4	104	44.0-160			5.92	20
Methylene Chloride	0.00500	0.00499	0.00506	99.8	101	67.0-120			1.39	20
4-Methyl-2-pentanone (MIBK)	0.0250	0.0226	0.0228	90.4	91.2	68.0-142			0.881	20
Styrene	0.00500	0.00454	0.00453	90.8	90.6	73.0-130			0.221	20
1,1,1,2-Tetrachloroethane	0.00500	0.00506	0.00510	101	102	75.0-125			0.787	20
1,1,2,2-Tetrachloroethane	0.00500	0.00463	0.00475	92.6	95.0	65.0-130			2.56	20
Tetrachloroethene	0.00500	0.00485	0.00488	97.0	97.6	72.0-132			0.617	20
Toluene	0.00500	0.00451	0.00454	90.2	90.8	79.0-120			0.663	20
1,1,1-Trichloroethane	0.00500	0.00570	0.00596	114	119	73.0-124			4.46	20
1,1,2-Trichloroethane	0.00500	0.00479	0.00463	95.8	92.6	80.0-120			3.40	20
Trichloroethene	0.00500	0.00516	0.00531	103	106	78.0-124			2.87	20
Trichlorofluoromethane	0.00500	0.00407	0.00434	81.4	86.8	59.0-147			6.42	20
1,2,3-Trichloropropane	0.00500	0.00493	0.00506	98.6	101	73.0-130			2.60	20
Vinyl acetate	0.0250	0.0281	0.0285	112	114	11.0-160			1.41	20
Vinyl chloride	0.00500	0.00429	0.00478	85.8	95.6	67.0-131			10.8	20
Xylenes, Total	0.0150	0.0138	0.0140	92.0	93.3	79.0-123			1.44	20
(S) Toluene-d8				*99.3*	*96.8*	*80.0-120*				
(S) 4-Bromofluorobenzene				*103*	*99.7*	*77.0-126*				
(S) 1,2-Dichloroethane-d4				*112*	*113*	*70.0-130*				

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

Method Blank (MB)

(MB) R3505072-2 03/02/20 10:43

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Acetone	U		0.0100	0.0500
Acrylonitrile	U		0.00187	0.0100
Benzene	U		0.000331	0.00100
Bromodichloromethane	U		0.000380	0.00100
Bromochloromethane	U		0.000520	0.00100
Bromoform	U		0.000469	0.00100
Bromomethane	U		0.000866	0.00500
Carbon disulfide	U		0.000275	0.00100
Carbon tetrachloride	U		0.000379	0.00100
Chlorobenzene	U		0.000348	0.00100
Chlorodibromomethane	U		0.000327	0.00100
Chloroethane	U		0.000453	0.00500
Chloroform	U		0.000324	0.00500
Chloromethane	U		0.000276	0.00250
1,2-Dibromo-3-Chloropropane	U		0.00133	0.00500
1,2-Dibromoethane	U		0.000381	0.00100
Dibromomethane	U		0.000346	0.00100
1,2-Dichlorobenzene	U		0.000349	0.00100
1,4-Dichlorobenzene	U		0.000274	0.00100
trans-1,4-Dichloro-2-butene	U		0.000866	0.00250
1,1-Dichloroethane	U		0.000259	0.00100
1,2-Dichloroethane	U		0.000361	0.00100
1,1-Dichloroethene	U		0.000398	0.00100
cis-1,2-Dichloroethene	U		0.000260	0.00100
trans-1,2-Dichloroethene	U		0.000396	0.00100
1,2-Dichloropropane	U		0.000306	0.00100
cis-1,3-Dichloropropene	U		0.000418	0.00100
trans-1,3-Dichloropropene	U		0.000419	0.00100
Ethylbenzene	U		0.000384	0.00100
2-Hexanone	U		0.00382	0.0100
Iodomethane	U		0.00171	0.0100
2-Butanone (MEK)	U		0.00393	0.0100
Methylene Chloride	U		0.00100	0.00500
4-Methyl-2-pentanone (MIBK)	U		0.00214	0.0100
Styrene	U		0.000307	0.00100
1,1,1,2-Tetrachloroethane	U		0.000385	0.00100
1,1,2,2-Tetrachloroethane	U		0.000130	0.00100
Tetrachloroethene	U		0.000372	0.00100
Toluene	U		0.000412	0.00100
1,1,1-Trichloroethane	U		0.000319	0.00100

Method Blank (MB)

(MB) R3505072-2 03/02/20 10:43

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
1,1,2-Trichloroethane	U		0.000383	0.00100
Trichloroethene	U		0.000398	0.00100
Trichlorofluoromethane	U		0.00120	0.00500
1,2,3-Trichloropropane	U		0.000807	0.00250
Vinyl acetate	U		0.00163	0.0100
Vinyl chloride	U		0.000259	0.00100
Xylenes, Total	U		0.00106	0.00300
(S) Toluene-d8	*101*			*80.0-120*
(S) 4-Bromofluorobenzene	*101*			*77.0-126*
(S) 1,2-Dichloroethane-d4	*106*			*70.0-130*

Laboratory Control Sample (LCS)

(LCS) R3505072-1 03/02/20 09:26

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Acetone	0.0250	0.0334	134	19.0-160	
Acrylonitrile	0.0250	0.0315	126	55.0-149	
Benzene	0.00500	0.00440	88.0	70.0-123	
Bromodichloromethane	0.00500	0.00451	90.2	75.0-120	
Bromochloromethane	0.00500	0.00489	97.8	76.0-122	
Bromoform	0.00500	0.00499	99.8	68.0-132	
Bromomethane	0.00500	0.00490	98.0	10.0-160	
Carbon disulfide	0.00500	0.00417	83.4	61.0-128	
Carbon tetrachloride	0.00500	0.00447	89.4	68.0-126	
Chlorobenzene	0.00500	0.00468	93.6	80.0-121	
Chlorodibromomethane	0.00500	0.00488	97.6	77.0-125	
Chloroethane	0.00500	0.00481	96.2	47.0-150	
Chloroform	0.00500	0.00435	87.0	73.0-120	
Chloromethane	0.00500	0.00651	130	41.0-142	
1,2-Dibromo-3-Chloropropane	0.00500	0.00503	101	58.0-134	
1,2-Dibromoethane	0.00500	0.00499	99.8	80.0-122	
Dibromomethane	0.00500	0.00492	98.4	80.0-120	
1,2-Dichlorobenzene	0.00500	0.00484	96.8	79.0-121	
1,4-Dichlorobenzene	0.00500	0.00471	94.2	79.0-120	
trans-1,4-Dichloro-2-butene	0.00500	0.00383	76.6	33.0-144	
1,1-Dichloroethane	0.00500	0.00447	89.4	70.0-126	
1,2-Dichloroethane	0.00500	0.00492	98.4	70.0-128	
1,1-Dichloroethene	0.00500	0.00414	82.8	71.0-124	

Laboratory Control Sample (LCS)

(LCS) R3505072-1 03/02/20 09:26

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
cis-1,2-Dichloroethene	0.00500	0.00457	91.4	73.0-120	
trans-1,2-Dichloroethene	0.00500	0.00434	86.8	73.0-120	
1,2-Dichloropropane	0.00500	0.00501	100	77.0-125	
cis-1,3-Dichloropropene	0.00500	0.00454	90.8	80.0-123	
trans-1,3-Dichloropropene	0.00500	0.00464	92.8	78.0-124	
Ethylbenzene	0.00500	0.00459	91.8	79.0-123	
2-Hexanone	0.0250	0.0282	113	67.0-149	
Iodomethane	0.0250	0.0215	86.0	33.0-147	
2-Butanone (MEK)	0.0250	0.0342	137	44.0-160	
Methylene Chloride	0.00500	0.00457	91.4	67.0-120	
4-Methyl-2-pentanone (MIBK)	0.0250	0.0285	114	68.0-142	
Styrene	0.00500	0.00443	88.6	73.0-130	
1,1,1,2-Tetrachloroethane	0.00500	0.00436	87.2	75.0-125	
1,1,2,2-Tetrachloroethane	0.00500	0.00407	81.4	65.0-130	
Tetrachloroethene	0.00500	0.00456	91.2	72.0-132	
Toluene	0.00500	0.00459	91.8	79.0-120	
1,1,1-Trichloroethane	0.00500	0.00428	85.6	73.0-124	
1,1,2-Trichloroethane	0.00500	0.00504	101	80.0-120	
Trichloroethene	0.00500	0.00442	88.4	78.0-124	
Trichlorofluoromethane	0.00500	0.00417	83.4	59.0-147	
1,2,3-Trichloropropane	0.00500	0.00428	85.6	73.0-130	
Vinyl acetate	0.0250	0.0278	111	11.0-160	
Vinyl chloride	0.00500	0.00504	101	67.0-131	
Xylenes, Total	0.0150	0.0136	90.7	79.0-123	
(S) Toluene-d8			*103*	*80.0-120*	
(S) 4-Bromofluorobenzene			*99.4*	*77.0-126*	
(S) 1,2-Dichloroethane-d4			*108*	*70.0-130*	

Method Blank (MB)

(MB) R3505410-3 03/02/20 20:24

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Acetone	U		0.0100	0.0500
Acrylonitrile	U		0.00187	0.0100
Benzene	U		0.000331	0.00100
Bromodichloromethane	U		0.000380	0.00100
Bromochloromethane	U		0.000520	0.00100
Bromoform	U		0.000469	0.00100
Bromomethane	U		0.000866	0.00500
Carbon disulfide	U		0.000275	0.00100
Carbon tetrachloride	U		0.000379	0.00100
Chlorobenzene	U		0.000348	0.00100
Chlorodibromomethane	U		0.000327	0.00100
Chloroethane	U		0.000453	0.00500
Chloroform	U		0.000324	0.00500
Chloromethane	U		0.000276	0.00250
1,2-Dibromo-3-Chloropropane	U		0.00133	0.00500
1,2-Dibromoethane	U		0.000381	0.00100
Dibromomethane	U		0.000346	0.00100
1,2-Dichlorobenzene	U		0.000349	0.00100
1,4-Dichlorobenzene	U		0.000274	0.00100
trans-1,4-Dichloro-2-butene	U		0.000866	0.00250
1,1-Dichloroethane	U		0.000259	0.00100
1,2-Dichloroethane	U		0.000361	0.00100
1,1-Dichloroethene	U		0.000398	0.00100
cis-1,2-Dichloroethene	U		0.000260	0.00100
trans-1,2-Dichloroethene	U		0.000396	0.00100
1,2-Dichloropropane	U		0.000306	0.00100
cis-1,3-Dichloropropene	U		0.000418	0.00100
trans-1,3-Dichloropropene	U		0.000419	0.00100
Ethylbenzene	U		0.000384	0.00100
2-Hexanone	U		0.00382	0.0100
Iodomethane	U		0.00171	0.0100
2-Butanone (MEK)	U		0.00393	0.0100
Methylene Chloride	U		0.00100	0.00500
4-Methyl-2-pentanone (MIBK)	U		0.00214	0.0100
Styrene	U		0.000307	0.00100
1,1,1,2-Tetrachloroethane	U		0.000385	0.00100
1,1,2,2-Tetrachloroethane	U		0.000130	0.00100
Tetrachloroethene	U		0.000372	0.00100
Toluene	U		0.000412	0.00100
1,1,1-Trichloroethane	U		0.000319	0.00100

Method Blank (MB)

(MB) R3505410-3 03/02/20 20:24

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
1,1,2-Trichloroethane	U		0.000383	0.00100
Trichloroethene	U		0.000398	0.00100
Trichlorofluoromethane	U		0.00120	0.00500
1,2,3-Trichloropropane	U		0.000807	0.00250
Vinyl acetate	U		0.00163	0.0100
Vinyl chloride	U		0.000259	0.00100
Xylenes, Total	U		0.00106	0.00300
(S) Toluene-d8	*97.9*			*80.0-120*
(S) 4-Bromofluorobenzene	*99.7*			*77.0-126*
(S) 1,2-Dichloroethane-d4	*114*			*70.0-130*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3505410-1 03/02/20 19:24 • (LCSD) R3505410-2 03/02/20 19:44

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Acetone	0.0250	ND	0.0213	0.000	85.2	19.0-160	J4	J3	200	27
Acrylonitrile	0.0250	0.0253	0.0282	101	113	55.0-149			10.8	20
Benzene	0.00500	0.00514	0.00490	103	98.0	70.0-123			4.78	20
Bromodichloromethane	0.00500	0.00543	0.00546	109	109	75.0-120			0.551	20
Bromochloromethane	0.00500	0.00552	0.00534	110	107	76.0-122			3.31	20
Bromoform	0.00500	0.00487	0.00495	97.4	99.0	68.0-132			1.63	20
Bromomethane	0.00500	0.00588	0.00574	118	115	10.0-160			2.41	25
Carbon disulfide	0.00500	0.00467	0.00458	93.4	91.6	61.0-128			1.95	20
Carbon tetrachloride	0.00500	0.00555	0.00547	111	109	68.0-126			1.45	20
Chlorobenzene	0.00500	0.00461	0.00453	92.2	90.6	80.0-121			1.75	20
Chlorodibromomethane	0.00500	0.00499	0.00485	99.8	97.0	77.0-125			2.85	20
Chloroethane	0.00500	0.00700	0.00702	140	140	47.0-150			0.285	20
Chloroform	0.00500	0.00536	0.00540	107	108	73.0-120			0.744	20
Chloromethane	0.00500	0.00464	0.00424	92.8	84.8	41.0-142			9.01	20
1,2-Dibromo-3-Chloropropane	0.00500	0.00379	0.00415	75.8	83.0	58.0-134			9.07	20
1,2-Dibromoethane	0.00500	0.00474	0.00481	94.8	96.2	80.0-122			1.47	20
Dibromomethane	0.00500	0.00554	0.00563	111	113	80.0-120			1.61	20
1,2-Dichlorobenzene	0.00500	0.00435	0.00448	87.0	89.6	79.0-121			2.94	20
1,4-Dichlorobenzene	0.00500	0.00458	0.00432	91.6	86.4	79.0-120			5.84	20
trans-1,4-Dichloro-2-butene	0.00500	0.00333	0.00313	66.6	62.6	33.0-144			6.19	20
1,1-Dichloroethane	0.00500	0.00510	0.00498	102	99.6	70.0-126			2.38	20
1,2-Dichloroethane	0.00500	0.00581	0.00561	116	112	70.0-128			3.50	20
1,1-Dichloroethene	0.00500	0.00499	0.00478	99.8	95.6	71.0-124			4.30	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3505410-1 03/02/20 19:24 • (LCSD) R3505410-2 03/02/20 19:44

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
cis-1,2-Dichloroethene	0.00500	0.00531	0.00507	106	101	73.0-120			4.62	20
trans-1,2-Dichloroethene	0.00500	0.00538	0.00511	108	102	73.0-120			5.15	20
1,2-Dichloropropane	0.00500	0.00481	0.00479	96.2	95.8	77.0-125			0.417	20
cis-1,3-Dichloropropene	0.00500	0.00533	0.00517	107	103	80.0-123			3.05	20
trans-1,3-Dichloropropene	0.00500	0.00468	0.00478	93.6	95.6	78.0-124			2.11	20
Ethylbenzene	0.00500	0.00467	0.00446	93.4	89.2	79.0-123			4.60	20
2-Hexanone	0.0250	0.0227	0.0225	90.8	90.0	67.0-149			0.885	20
Iodomethane	0.0250	0.0273	0.0265	109	106	33.0-147			2.97	26
2-Butanone (MEK)	0.0250	0.0237	0.0269	94.8	108	44.0-160			12.6	20
Methylene Chloride	0.00500	0.00533	0.00532	107	106	67.0-120			0.188	20
4-Methyl-2-pentanone (MIBK)	0.0250	0.0233	0.0228	93.2	91.2	68.0-142			2.17	20
Styrene	0.00500	0.00458	0.00453	91.6	90.6	73.0-130			1.10	20
1,1,1,2-Tetrachloroethane	0.00500	0.00499	0.00514	99.8	103	75.0-125			2.96	20
1,1,2,2-Tetrachloroethane	0.00500	0.00472	0.00448	94.4	89.6	65.0-130			5.22	20
Tetrachloroethene	0.00500	0.00504	0.00468	101	93.6	72.0-132			7.41	20
Toluene	0.00500	0.00460	0.00447	92.0	89.4	79.0-120			2.87	20
1,1,1-Trichloroethane	0.00500	0.00627	0.00610	125	122	73.0-124	J4		2.75	20
1,1,2-Trichloroethane	0.00500	0.00462	0.00457	92.4	91.4	80.0-120			1.09	20
Trichloroethene	0.00500	0.00525	0.00527	105	105	78.0-124			0.380	20
Trichlorofluoromethane	0.00500	0.00483	0.00164	96.6	32.8	59.0-147		J3 J4	98.6	20
1,2,3-Trichloropropane	0.00500	0.00538	0.00481	108	96.2	73.0-130			11.2	20
Vinyl acetate	0.0250	0.0313	0.0278	125	111	11.0-160			11.8	20
Vinyl chloride	0.00500	0.00539	0.00467	108	93.4	67.0-131			14.3	20
Xylenes, Total	0.0150	0.0140	0.0138	93.3	92.0	79.0-123			1.44	20
(S) Toluene-d8				*99.4*	*98.1*	*80.0-120*				
(S) 4-Bromofluorobenzene				*99.5*	*104*	*77.0-126*				
(S) 1,2-Dichloroethane-d4				*115*	*118*	*70.0-130*				

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

Method Blank (MB)

(MB) R3505070-1 03/03/20 13:51

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Ethylene Dibromide	U		0.00000240	0.0000100
1,2-Dibromo-3-Chloropropane	U		0.00000430	0.0000200

L1194083-14 Original Sample (OS) • Duplicate (DUP)

(OS) L1194083-14 03/03/20 14:40 • (DUP) R3505070-3 03/03/20 14:27

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Ethylene Dibromide	U	0.000	1	0.000		20
1,2-Dibromo-3-Chloropropane	U	0.000	1	0.000		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3505070-4 03/03/20 16:27 • (LCSD) R3505070-5 03/03/20 18:39

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Ethylene Dibromide	0.000250	0.000230	0.000244	92.0	97.6	60.0-140			5.91	20
1,2-Dibromo-3-Chloropropane	0.000250	0.000245	0.000261	98.0	104	60.0-140			6.32	20

L1194083-16 Original Sample (OS) • Matrix Spike (MS)

(OS) L1194083-16 03/03/20 14:15 • (MS) R3505070-2 03/03/20 14:03

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Ethylene Dibromide	0.000100	U	0.000104	104	1	64.0-159	
1,2-Dibromo-3-Chloropropane	0.000100	U	0.000103	103	1	72.0-148	

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state “ND” (Not Detected) or “BDL” (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
B	The same analyte is found in the associated blank.
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL).
J	The identification of the analyte is acceptable; the reported value is an estimate.
J3	The associated batch QC was outside the established quality control range for precision.
J4	The associated batch QC was outside the established quality control range for accuracy.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
O1	The analyte failed the method required serial dilution test and/or subsequent post-spike criteria. These failures indicate matrix interference.
V	The sample concentration is too high to evaluate accurate spike recoveries.

Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.
* Not all certifications held by the laboratory are applicable to the results reported in the attached report.
* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	n/a
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina [1]	DW21704
Georgia	NELAP	North Carolina [3]	41
Georgia [1]	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LAO00356
Kentucky [1 6]	90010	South Carolina	84004
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1 4]	2006
Louisiana [1]	LA180010	Texas	T104704245-18-15
Maine	TN0002	Texas [5]	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

Third Party Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.

Civil & Environmental Consultants - TN

117 Seaboard Ln.

Billing Information:
Dr. Kevin Wolfe
117 Seaboard Ln.
Suite E100
Franklin, TN 37067

Email To: pcampbell@cecinc.com

Report to: Philip Campbell

Project Description: Former EWS Camden Class 2 La

City/State Collected: Camden, TN

Please Circle: PT MT CT ET

Phone: 615-333-7797
Fax: 615-333-7751

Client Project # 181-364

Lab Project # CEC-181364

Collected by (print): Adrian Campbell / Bangh

Site/Facility ID # CAMDEN, TN

P.O. #

Collected by (signature): Philip J. Campbell

Immediately Packed on Ice N ___ Y ✓

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

Pres Chk

Analysis / Container / Preservative

Chain of Custody Page 1 of 2

Pace Analytical® National Center for Testing & Innovation

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

SDG # L1194169

M084

Acctnum: CEC
Template: T133579
Prelogin: P757606
PM: 526 - Chris McCord
PB: 2/24/20 MM
Shipped Via: Courier

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	**WetChem** 250mlHDPE-NoPres	ALK 100ml Amb-NoPres	COD,NH3 250mlHDPE-H2SO4	Diss. Metals-FF 250mlHDPE-HNO3	SV8011 40mlClr-NaThio	Total Metals,HARD 250mlHDPE-HNO3	V8260AP1 40mlAmb-HCl	V8260AP1-Trip Blank 40mlAmb-HCl-Blk	Remarks	Sample # (lab only)
MW-1	Grab	GW	—	2-27-20	11:05	10	X	X	X	X	X	X	X			-01
MW-3		GW	—		13:50	10	X	X	X	X	X	X	X			-02
MW-4		GW	—		13:10	10	X	X	X	X	X	X	X			-03
MW-5		GW	—		12:05	10	X	X	X	X	X	X	X			-04
TMW-1		GW	—		12:40	10	X	X	X	X	X	X	X			-05
TMW-2		GW	—		14:30	10	X	X	X	X	X	X	X			-06
TMW-3		GW	—		15:45	10	X	X	X	X	X	X	X			-07
DUPLICATE		GW	—		—	10	X	X	X	X	X	X	X			-08
FIELD BLANK		GW	—		14:45	10	X	X	X		X	X	X			-09
~~EQUIPMENT BLANK~~ PC 2-28-20		GW				10	X	X	X		X	X	X			

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks:**WetChem** = *NITRATE*,CHLORIDE,BROMIDE,SULFATE,FLUORIDE
Tot/Diss Metals=M6020AP1+Al,Ca,Fe,K,Mg,Mn,Na,B(6010/7470).
only Total Metals analysis

pH _____ Temp _____
Flow _____ Other _____

Samples returned via: __ UPS __ FedEx X Courier

Tracking #

Sample Receipt Checklist
COC Seal Present/Intact: NP Y N
COC Signed/Accurate: Y N
Bottles arrive intact: Y N
Correct bottles used: Y N
Sufficient volume sent: Y N
If Applicable
VOA Zero Headspace: Y N
Preservation Correct/Checked: Y N
RAD Screen <0.5 mR/hr: Y N

	Date:	Time:	
Relinquished by: (Signature) Philip J. Campbell	2-28-20	10:00	Received by: (Signature)
Relinquished by: (Signature)	2/28/20	14:30	Received by: (Signature)
Relinquished by: (Signature)	Date:	Time:	Received for lab by: (Signature)

Trip Blank Received: Yes / No
HCl / MeoH
TBR

Temp: wet 4.3°C .3-.1=.2

Bottles Received: 90

Date: 2-28-20 Time: 1430

If preservation required by Login: Date/Time

Hold:

Condition: NCF / OK

Civil & Environmental Consultants - TN

117 Seaboard Ln.

Billing Information:
Dr. Kevin Wolfe
117 Seaboard Ln.
Suite E100
Franklin, TN 37067

Email To: pcampbell@cecinc.com

Report to: Philip Campbell

Project Description: Former EWS Camden Class 2 La

City/State Collected: Camden, TN

Please Circle: PT MT CT ET

Phone: 615-333-7797
Fax: 615-333-7751

Client Project # 181-364

Lab Project # CEC-181364

Collected by (print): Adrian Bangh / Philip Campbell

Site/Facility ID # CAMDEN, TN

P.O. #

Collected by (signature): Philip Campbell

Immediately Packed on Ice N ___ Y ✓

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

Pres Chk

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	**WetChem** 250mlHDPE-NoPres	ALK 100ml Amb-NoPres	COD,NH3 250mlHDPE-H2SO4	Diss. Metals-FF 250mlHDPE-HNO3	SV8011 40mlClr-NaThio	Total Metals,HARD 250mlHDPE-HNO3	V8260AP1 40mlAmb-HCl	V8260AP1-Trip Blank 40mlAmb-HCl-Blk			Remarks	Sample # (lab only)
TRIP BLANK	—	GW	—	—	—	1								X				-10

Chain of Custody Page 2 of 2

Pace Analytical® National Center for Testing & Innovation

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

SDG # L194169

Table #

Acctnum: CEC

Template: T133579

Prelogin: P757606

PM: 526 - Chris McCord

PB: 2/24/20 mb

Shipped Via: Courier

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks:**WetChem** = *NITRATE*,CHLORIDE,BROMIDE,SULFATE,FLUORIDE Tot/Diss Metals=M6020AP1+Al,Ca,Fe,K,Mg,Mn,Na,B(6010/7470).

pH _____ Temp _____

Flow _____ Other _____

Samples returned via: __ UPS __ FedEx X Courier

Tracking #

Sample Receipt Checklist
COC Seal Present/Intact: NP Y N
COC Signed/Accurate: Y N
Bottles arrive intact: Y N
Correct bottles used: Y N
Sufficient volume sent: Y N
If Applicable
VOA Zero Headspace: Y N
Preservation Correct/Checked: Y N
RAD Screen <0.5 mR/hr: Y N

	Date:	Time:	
Relinquished by: (Signature) Philip Campbell	2-28-20	10:00	Received by: (Signature)
Relinquished by: (Signature)	2-28-20	14:30	Received by: (Signature)
Relinquished by: (Signature)	Date:	Time:	Received for lab by: (Signature)

Trip Blank Received: Yes / No HCl / MeoH TBR

Temp: WW A3 °C .3-.1=.2 Bottles Received: 90

Date: 2-28-20 Time: 1430

If preservation required by Login: Date/Time

Hold:

Condition: NCF / OK

Pace Analytical®
National Center for Testing & Innovation

ANALYTICAL REPORT

March 13, 2020

Civil & Environmental Consultants - TN

Sample Delivery Group:	L1195591
Samples Received:	03/04/2020
Project Number:	181-364
Description:	EWS Camden Class 2 Landfill
Site:	CAMDEN, TN
Report To:	Philip Campbell 117 Seaboard Ln. Suite E100 Franklin, TN 37067

Entire Report Reviewed By:

Chris McCord
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.

TABLE OF CONTENTS

IWC-L L1195591-01 GW

Collected by: Todd Hughes | Collected date/time: 03/03/20 14:20 | Received date/time: 03/04/20 15:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 130.1	WG1437933	50	03/05/20 09:11	03/09/20 17:28	BAM	Mt. Juliet, TN
Wet Chemistry by Method 2320 B-2011	WG1437605	1	03/05/20 20:24	03/05/20 20:24	DGR	Mt. Juliet, TN
Wet Chemistry by Method 350.1	WG1438957	50	03/05/20 21:31	03/05/20 21:31	AJC	Mt. Juliet, TN
Wet Chemistry by Method 410.4	WG1439043	10	03/06/20 02:14	03/06/20 06:22	AKA	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1437861	1	03/04/20 20:05	03/04/20 20:05	ST	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1437861	100	03/04/20 20:21	03/04/20 20:21	ST	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1437861	1000	03/04/20 20:36	03/04/20 20:36	ST	Mt. Juliet, TN
Mercury by Method 7470A	WG1438249	1	03/05/20 14:23	03/06/20 12:11	TRB	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1438214	1	03/05/20 17:24	03/06/20 21:54	EL	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1438974	10	03/05/20 20:17	03/05/20 23:53	LAT	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1438974	10	03/05/20 20:17	03/06/20 09:16	LAT	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1438974	5	03/05/20 20:17	03/05/20 23:49	LAT	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1438534	5	03/05/20 18:35	03/05/20 18:35	BMB	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1441601	50	03/10/20 23:13	03/10/20 23:13	ADM	Mt. Juliet, TN
EDB / DBCP by Method 8011	WG1439198	1	03/06/20 10:44	03/07/20 00:48	LEL	Mt. Juliet, TN

APWC-L L1195591-02 GW

Collected by: Todd Hughes | Collected date/time: 03/03/20 13:06 | Received date/time: 03/04/20 15:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 130.1	WG1438632	1	03/06/20 16:09	03/09/20 11:38	BAM	Mt. Juliet, TN
Wet Chemistry by Method 2320 B-2011	WG1437605	5	03/05/20 23:10	03/05/20 23:10	DGR	Mt. Juliet, TN
Wet Chemistry by Method 350.1	WG1438519	1000	03/05/20 16:45	03/05/20 16:45	AJC	Mt. Juliet, TN
Wet Chemistry by Method 410.4	WG1439043	10	03/06/20 02:14	03/06/20 06:22	AKA	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1437861	1000	03/04/20 21:07	03/04/20 21:07	ST	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1437861	20	03/04/20 20:51	03/04/20 20:51	ST	Mt. Juliet, TN
Mercury by Method 7470A	WG1440073	1	03/08/20 20:21	03/09/20 15:32	SD	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1438619	1	03/06/20 11:11	03/09/20 20:09	EL	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1438623	1	03/06/20 09:36	03/06/20 12:38	JPD	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1438623	10	03/06/20 09:36	03/06/20 13:29	JPD	Mt. Juliet, TN
Metals (ICPMS) by Method 6020A	WG1438623	50	03/06/20 09:36	03/06/20 12:46	JPD	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1438534	1	03/05/20 18:58	03/05/20 18:58	BMB	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1441601	1	03/10/20 23:34	03/10/20 23:34	ADM	Mt. Juliet, TN
EDB / DBCP by Method 8011	WG1439198	1	03/06/20 10:44	03/07/20 01:00	LEL	Mt. Juliet, TN

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Chris McCord
Project Manager

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (colorimetric) as CaCO3	5300		1500	50	03/09/2020 17:28	WG1437933

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Alkalinity	36.9	B	20.0	1	03/05/2020 20:24	WG1437605

Sample Narrative:
L1195591-01 WG1437605: Endpoint pH 4.5

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Ammonia Nitrogen	179		5.00	50	03/05/2020 21:31	WG1438957

Wet Chemistry by Method 410.4

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
COD	637		100	10	03/06/2020 06:22	WG1439043

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Bromide	ND		100	100	03/04/2020 20:21	WG1437861
Chloride	10300		1000	1000	03/04/2020 20:36	WG1437861
Fluoride	ND		0.100	1	03/04/2020 20:05	WG1437861
Nitrate	0.119		0.100	1	03/04/2020 20:05	WG1437861
Sulfate	ND		500	100	03/04/2020 20:21	WG1437861

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	03/06/2020 12:11	WG1438249

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Boron	ND		0.200	1	03/06/2020 21:54	WG1438214

Metals (ICPMS) by Method 6020A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Aluminum	30.3		0.500	5	03/05/2020 23:49	WG1438974
Antimony	ND		0.0100	5	03/05/2020 23:49	WG1438974
Arsenic	0.0268		0.0200	10	03/05/2020 23:53	WG1438974
Barium	0.384		0.0250	5	03/05/2020 23:49	WG1438974
Beryllium	ND		0.0100	5	03/05/2020 23:49	WG1438974
Cadmium	6.58		0.00500	5	03/05/2020 23:49	WG1438974
Calcium	1760		5.00	5	03/05/2020 23:49	WG1438974
Chromium	1.49		0.0200	10	03/06/2020 09:16	WG1438974
Cobalt	0.119		0.0200	10	03/05/2020 23:53	WG1438974
Copper	1.73		0.0250	5	03/05/2020 23:49	WG1438974

Metals (ICPMS) by Method 6020A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Iron	68.7		1.00	10	03/05/2020 23:53	WG1438974
Lead	0.0802		0.0100	5	03/05/2020 23:49	WG1438974
Magnesium	185		5.00	5	03/05/2020 23:49	WG1438974
Manganese	17.4		0.0500	10	03/05/2020 23:53	WG1438974
Nickel	0.996		0.0200	10	03/05/2020 23:53	WG1438974
Potassium	1510		5.00	5	03/05/2020 23:49	WG1438974
Selenium	0.0215		0.0100	5	03/05/2020 23:49	WG1438974
Silver	ND		0.0100	5	03/05/2020 23:49	WG1438974
Sodium	2480		5.00	5	03/05/2020 23:49	WG1438974
Thallium	ND		0.0100	5	03/05/2020 23:49	WG1438974
Vanadium	ND		0.0500	10	03/05/2020 23:53	WG1438974
Zinc	73.7		0.250	10	03/05/2020 23:53	WG1438974

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Acetone	0.970	B J4	0.250	5	03/05/2020 18:35	WG1438534
Acrylonitrile	ND		0.0500	5	03/05/2020 18:35	WG1438534
Benzene	ND		0.00500	5	03/05/2020 18:35	WG1438534
Bromochloromethane	ND		0.00500	5	03/05/2020 18:35	WG1438534
Bromodichloromethane	ND		0.00500	5	03/05/2020 18:35	WG1438534
Bromoform	ND		0.00500	5	03/05/2020 18:35	WG1438534
Bromomethane	ND		0.0250	5	03/05/2020 18:35	WG1438534
Carbon disulfide	3.48		0.0500	50	03/10/2020 23:13	WG1441601
Carbon tetrachloride	ND		0.00500	5	03/05/2020 18:35	WG1438534
Chlorobenzene	ND		0.00500	5	03/05/2020 18:35	WG1438534
Chlorodibromomethane	ND		0.00500	5	03/05/2020 18:35	WG1438534
Chloroethane	ND		0.0250	5	03/05/2020 18:35	WG1438534
Chloroform	ND		0.0250	5	03/05/2020 18:35	WG1438534
Chloromethane	ND		0.0125	5	03/05/2020 18:35	WG1438534
Dibromomethane	ND		0.00500	5	03/05/2020 18:35	WG1438534
1,2-Dibromo-3-Chloropropane	ND		0.0250	5	03/05/2020 18:35	WG1438534
1,2-Dibromoethane	ND		0.00500	5	03/05/2020 18:35	WG1438534
1,2-Dichlorobenzene	ND		0.00500	5	03/05/2020 18:35	WG1438534
1,4-Dichlorobenzene	ND		0.00500	5	03/05/2020 18:35	WG1438534
trans-1,4-Dichloro-2-butene	ND		0.0125	5	03/05/2020 18:35	WG1438534
1,1-Dichloroethane	ND		0.00500	5	03/05/2020 18:35	WG1438534
1,2-Dichloroethane	ND		0.00500	5	03/05/2020 18:35	WG1438534
1,1-Dichloroethene	ND		0.00500	5	03/05/2020 18:35	WG1438534
cis-1,2-Dichloroethene	ND		0.00500	5	03/05/2020 18:35	WG1438534
trans-1,2-Dichloroethene	ND	J4	0.00500	5	03/05/2020 18:35	WG1438534
1,2-Dichloropropane	ND		0.00500	5	03/05/2020 18:35	WG1438534
cis-1,3-Dichloropropene	ND		0.00500	5	03/05/2020 18:35	WG1438534
trans-1,3-Dichloropropene	ND		0.00500	5	03/05/2020 18:35	WG1438534
Ethylbenzene	ND		0.00500	5	03/05/2020 18:35	WG1438534
2-Hexanone	ND		0.0500	5	03/05/2020 18:35	WG1438534
Iodomethane	ND	J3 J4	0.0500	5	03/05/2020 18:35	WG1438534
2-Butanone (MEK)	0.171		0.0500	5	03/05/2020 18:35	WG1438534
Methylene Chloride	ND		0.0250	5	03/05/2020 18:35	WG1438534
4-Methyl-2-pentanone (MIBK)	ND		0.0500	5	03/05/2020 18:35	WG1438534
Styrene	ND		0.00500	5	03/05/2020 18:35	WG1438534
1,1,1,2-Tetrachloroethane	ND		0.00500	5	03/05/2020 18:35	WG1438534
1,1,2,2-Tetrachloroethane	ND		0.00500	5	03/05/2020 18:35	WG1438534
Tetrachloroethene	ND		0.00500	5	03/05/2020 18:35	WG1438534
Toluene	ND		0.00500	5	03/05/2020 18:35	WG1438534
1,1,1-Trichloroethane	ND		0.00500	5	03/05/2020 18:35	WG1438534

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
1,1,2-Trichloroethane	ND	J4	0.00500	5	03/05/2020 18:35	WG1438534
Trichloroethene	ND		0.00500	5	03/05/2020 18:35	WG1438534
Trichlorofluoromethane	ND		0.0250	5	03/05/2020 18:35	WG1438534
1,2,3-Trichloropropane	ND		0.0125	5	03/05/2020 18:35	WG1438534
Vinyl acetate	ND		0.0500	5	03/05/2020 18:35	WG1438534
Vinyl chloride	ND		0.00500	5	03/05/2020 18:35	WG1438534
Xylenes, Total	ND		0.0150	5	03/05/2020 18:35	WG1438534
(S) Toluene-d8	*103*		*80.0-120*		*03/05/2020 18:35*	WG1438534
(S) Toluene-d8	*102*		*80.0-120*		*03/10/2020 23:13*	WG1441601
(S) 4-Bromofluorobenzene	*97.4*		*77.0-126*		*03/05/2020 18:35*	WG1438534
(S) 4-Bromofluorobenzene	*106*		*77.0-126*		*03/10/2020 23:13*	WG1441601
(S) 1,2-Dichloroethane-d4	*99.3*		*70.0-130*		*03/05/2020 18:35*	WG1438534
(S) 1,2-Dichloroethane-d4	*88.7*		*70.0-130*		*03/10/2020 23:13*	WG1441601

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000100	1	03/07/2020 00:48	WG1439198
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	03/07/2020 00:48	WG1439198

Wet Chemistry by Method 130.1

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Hardness (colorimetric) as CaCO3	36.1	B	30.0	1	03/09/2020 11:38	WG1438632

Wet Chemistry by Method 2320 B-2011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Alkalinity	5080		100	5	03/05/2020 23:10	WG1437605

Sample Narrative:
L1195591-02 WG1437605: Endpoint pH 4.5

Wet Chemistry by Method 350.1

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ammonia Nitrogen	1710		100	1000	03/05/2020 16:45	WG1438519

Wet Chemistry by Method 410.4

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
COD	2580		100	10	03/06/2020 06:22	WG1439043

Wet Chemistry by Method 9056A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Bromide	ND		20.0	20	03/04/2020 20:51	WG1437861
Chloride	22300		1000	1000	03/04/2020 21:07	WG1437861
Fluoride	14.6		2.00	20	03/04/2020 20:51	WG1437861
Nitrate	129		2.00	20	03/04/2020 20:51	WG1437861
Sulfate	278		100	20	03/04/2020 20:51	WG1437861

Mercury by Method 7470A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Mercury	ND		0.000200	1	03/09/2020 15:32	WG1440073

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Boron	4.57		0.200	1	03/09/2020 20:09	WG1438619

Metals (ICPMS) by Method 6020A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Aluminum	3.88		0.100	1	03/06/2020 12:38	WG1438623
Antimony	0.0220		0.0200	10	03/06/2020 13:29	WG1438623
Arsenic	0.0564		0.00200	1	03/06/2020 12:38	WG1438623
Barium	0.178		0.0500	10	03/06/2020 13:29	WG1438623
Beryllium	ND		0.00200	1	03/06/2020 12:38	WG1438623
Cadmium	0.00538		0.00100	1	03/06/2020 12:38	WG1438623
Calcium	4.01		1.00	1	03/06/2020 12:38	WG1438623
Chromium	0.0755		0.00200	1	03/06/2020 12:38	WG1438623
Cobalt	0.0116		0.00200	1	03/06/2020 12:38	WG1438623
Copper	7.71		0.250	50	03/06/2020 12:46	WG1438623

Metals (ICPMS) by Method 6020A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Iron	2.96		0.100	1	03/06/2020 12:38	WG1438623
Lead	ND		0.0200	10	03/06/2020 13:29	WG1438623
Magnesium	ND		1.00	1	03/06/2020 12:38	WG1438623
Manganese	0.0602		0.00500	1	03/06/2020 12:38	WG1438623
Nickel	0.114		0.00200	1	03/06/2020 12:38	WG1438623
Potassium	5630		10.0	10	03/06/2020 13:29	WG1438623
Selenium	0.0441		0.00200	1	03/06/2020 12:38	WG1438623
Silver	ND		0.0200	10	03/06/2020 13:29	WG1438623
Sodium	8270		10.0	10	03/06/2020 13:29	WG1438623
Thallium	ND		0.0200	10	03/06/2020 13:29	WG1438623
Vanadium	0.0654		0.00500	1	03/06/2020 12:38	WG1438623
Zinc	0.757		0.0250	1	03/06/2020 12:38	WG1438623

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Acetone	0.223	B J4	0.0500	1	03/05/2020 18:58	WG1438534
Acrylonitrile	ND		0.0100	1	03/05/2020 18:58	WG1438534
Benzene	ND		0.00100	1	03/05/2020 18:58	WG1438534
Bromochloromethane	ND		0.00100	1	03/05/2020 18:58	WG1438534
Bromodichloromethane	ND		0.00100	1	03/05/2020 18:58	WG1438534
Bromoform	ND		0.00100	1	03/05/2020 18:58	WG1438534
Bromomethane	ND		0.00500	1	03/05/2020 18:58	WG1438534
Carbon disulfide	ND		0.00100	1	03/10/2020 23:34	WG1441601
Carbon tetrachloride	ND		0.00100	1	03/05/2020 18:58	WG1438534
Chlorobenzene	ND		0.00100	1	03/05/2020 18:58	WG1438534
Chlorodibromomethane	ND		0.00100	1	03/05/2020 18:58	WG1438534
Chloroethane	ND		0.00500	1	03/05/2020 18:58	WG1438534
Chloroform	ND		0.00500	1	03/05/2020 18:58	WG1438534
Chloromethane	ND		0.00250	1	03/05/2020 18:58	WG1438534
Dibromomethane	ND		0.00100	1	03/05/2020 18:58	WG1438534
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	03/05/2020 18:58	WG1438534
1,2-Dibromoethane	ND		0.00100	1	03/05/2020 18:58	WG1438534
1,2-Dichlorobenzene	ND		0.00100	1	03/05/2020 18:58	WG1438534
1,4-Dichlorobenzene	ND		0.00100	1	03/05/2020 18:58	WG1438534
trans-1,4-Dichloro-2-butene	ND		0.00250	1	03/05/2020 18:58	WG1438534
1,1-Dichloroethane	ND		0.00100	1	03/05/2020 18:58	WG1438534
1,2-Dichloroethane	ND		0.00100	1	03/05/2020 18:58	WG1438534
1,1-Dichloroethene	ND		0.00100	1	03/05/2020 18:58	WG1438534
cis-1,2-Dichloroethene	ND		0.00100	1	03/05/2020 18:58	WG1438534
trans-1,2-Dichloroethene	ND	J4	0.00100	1	03/05/2020 18:58	WG1438534
1,2-Dichloropropane	ND		0.00100	1	03/05/2020 18:58	WG1438534
cis-1,3-Dichloropropene	ND		0.00100	1	03/05/2020 18:58	WG1438534
trans-1,3-Dichloropropene	ND		0.00100	1	03/05/2020 18:58	WG1438534
Ethylbenzene	ND		0.00100	1	03/05/2020 18:58	WG1438534
2-Hexanone	ND		0.0100	1	03/05/2020 18:58	WG1438534
Iodomethane	ND	J3 J4	0.0100	1	03/05/2020 18:58	WG1438534
2-Butanone (MEK)	0.0121		0.0100	1	03/05/2020 18:58	WG1438534
Methylene Chloride	ND		0.00500	1	03/05/2020 18:58	WG1438534
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	03/05/2020 18:58	WG1438534
Styrene	ND		0.00100	1	03/05/2020 18:58	WG1438534
1,1,1,2-Tetrachloroethane	ND		0.00100	1	03/05/2020 18:58	WG1438534
1,1,2,2-Tetrachloroethane	ND		0.00100	1	03/05/2020 18:58	WG1438534
Tetrachloroethene	ND		0.00100	1	03/05/2020 18:58	WG1438534
Toluene	ND		0.00100	1	03/05/2020 18:58	WG1438534
1,1,1-Trichloroethane	ND		0.00100	1	03/05/2020 18:58	WG1438534

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
1,1,2-Trichloroethane	ND	J4	0.00100	1	03/05/2020 18:58	WG1438534
Trichloroethene	ND		0.00100	1	03/05/2020 18:58	WG1438534
Trichlorofluoromethane	ND		0.00500	1	03/05/2020 18:58	WG1438534
1,2,3-Trichloropropane	ND		0.00250	1	03/05/2020 18:58	WG1438534
Vinyl acetate	ND		0.0100	1	03/05/2020 18:58	WG1438534
Vinyl chloride	ND		0.00100	1	03/05/2020 18:58	WG1438534
Xylenes, Total	ND		0.00300	1	03/05/2020 18:58	WG1438534
(S) Toluene-d8	*98.8*		*80.0-120*		*03/05/2020 18:58*	WG1438534
(S) Toluene-d8	*102*		*80.0-120*		*03/10/2020 23:34*	WG1441601
(S) 4-Bromofluorobenzene	*96.0*		*77.0-126*		*03/05/2020 18:58*	WG1438534
(S) 4-Bromofluorobenzene	*105*		*77.0-126*		*03/10/2020 23:34*	WG1441601
(S) 1,2-Dichloroethane-d4	*94.3*		*70.0-130*		*03/05/2020 18:58*	WG1438534
(S) 1,2-Dichloroethane-d4	*87.4*		*70.0-130*		*03/10/2020 23:34*	WG1441601

EDB / DBCP by Method 8011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ethylene Dibromide	ND		0.0000100	1	03/07/2020 01:00	WG1439198
1,2-Dibromo-3-Chloropropane	ND		0.0000200	1	03/07/2020 01:00	WG1439198

Method Blank (MB)

(MB) R3506852-1 03/09/20 16:37

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Hardness (colorimetric) as CaCO3	7.21	J	1.43	30.0

L1195228-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1195228-01 03/09/20 16:44 • (DUP) R3506852-5 03/09/20 16:44

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hardness (colorimetric) as CaCO3	61.6	67.2	1	8.70		20

L1195604-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1195604-01 03/09/20 16:53 • (DUP) R3506852-6 03/09/20 16:54

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hardness (colorimetric) as CaCO3	41.1	45.1	1	9.28		20

Laboratory Control Sample (LCS)

(LCS) R3506852-2 03/09/20 16:38

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Hardness (colorimetric) as CaCO3	100	89.4	89.4	85.0-115	

L1195178-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1195178-01 03/09/20 16:39 • (MS) R3506852-3 03/09/20 16:39 • (MSD) R3506852-4 03/09/20 16:40

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Hardness (colorimetric) as CaCO3	100	439	369	368	0.000	0.000	1	80.0-120	E V	E V	0.271	20

Method Blank (MB)

(MB) R3506717-1 03/09/20 11:37

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Hardness (colorimetric) as CaCO3	6.04	J	1.43	30.0

L1195730-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1195730-01 03/09/20 12:09 • (DUP) R3506717-5 03/09/20 12:09

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hardness (colorimetric) as CaCO3	745	735	5	1.35		20

L1196228-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1196228-01 03/09/20 12:00 • (DUP) R3506717-6 03/09/20 12:11

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hardness (colorimetric) as CaCO3	171	173	1	1.16		20

Laboratory Control Sample (LCS)

(LCS) R3506717-2 03/09/20 11:38

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Hardness (colorimetric) as CaCO3	100	90.8	90.8	85.0-115	

L1195636-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1195636-01 03/09/20 11:39 • (MS) R3506717-3 03/09/20 11:40 • (MSD) R3506717-4 03/09/20 11:41

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Hardness (colorimetric) as CaCO3	100	43.1	136	135	92.9	91.9	1	80.0-120			0.738	20

Method Blank (MB)

(MB) R3505868-1 03/05/20 18:43

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Alkalinity	4.01	J	2.71	20.0

Sample Narrative:
BLANK: Endpoint pH 4.5

L1195031-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1195031-01 03/05/20 18:52 • (DUP) R3505868-2 03/05/20 19:00

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Alkalinity	201	203	1	0.802		20

Sample Narrative:
OS: Endpoint pH 4.5
DUP: Endpoint pH 4.5

L1195127-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1195127-01 03/05/20 21:52 • (DUP) R3505868-4 03/05/20 22:01

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Alkalinity	16.6	13.4	1	21.0	J P1	20

Sample Narrative:
OS: Endpoint pH 4.5
DUP: Endpoint pH 4.5

Laboratory Control Sample (LCS)

(LCS) R3505868-3 03/05/20 20:12

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Alkalinity	100	96.7	96.7	85.0-115	

Sample Narrative:
LCS: Endpoint pH 4.5

Method Blank (MB)

(MB) R3505828-1 03/05/20 14:58

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Ammonia Nitrogen	U		0.0317	0.100

L1195034-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1195034-01 03/05/20 15:01 • (DUP) R3505828-3 03/05/20 15:03

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Ammonia Nitrogen	0.269	0.277	1	2.93		10

L1195461-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1195461-02 03/05/20 15:32 • (DUP) R3505828-6 03/05/20 15:33

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Ammonia Nitrogen	5.63	5.64	1	0.124		10

Laboratory Control Sample (LCS)

(LCS) R3505828-2 03/05/20 15:00

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Ammonia Nitrogen	7.50	7.57	101	90.0-110	

L1195115-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1195115-02 03/05/20 15:05 • (MS) R3505828-4 03/05/20 15:06 • (MSD) R3505828-5 03/05/20 15:08

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Ammonia Nitrogen	5.00	0.232	5.29	5.09	101	97.1	1	90.0-110			3.95	10

L1195549-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L1195549-01 03/05/20 15:35 • (MS) R3505828-7 03/05/20 16:49

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Ammonia Nitrogen	5.00	6.37	11.0	92.0	1	90.0-110	E

Method Blank (MB)

(MB) R3505852-1 03/05/20 20:36

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Ammonia Nitrogen	U		0.0317	0.100

L1195688-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1195688-01 03/05/20 20:50 • (DUP) R3505852-3 03/05/20 20:51

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Ammonia Nitrogen	2.12	2.13	1	0.0942		10

L1195712-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1195712-03 03/05/20 21:08 • (DUP) R3505852-6 03/05/20 21:10

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Ammonia Nitrogen	4.09	4.07	1	0.686		10

Laboratory Control Sample (LCS)

(LCS) R3505852-2 03/05/20 20:38

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Ammonia Nitrogen	7.50	7.67	102	90.0-110	

L1195696-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1195696-01 03/05/20 20:58 • (MS) R3505852-4 03/05/20 21:00 • (MSD) R3505852-5 03/05/20 21:01

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Ammonia Nitrogen	5.00	ND	4.90	4.97	98.0	99.5	1	90.0-110			1.46	10

L1195713-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L1195713-01 03/05/20 21:11 • (MS) R3505852-7 03/05/20 21:13

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Ammonia Nitrogen	5.00	0.153	5.24	102	1	90.0-110	

Method Blank (MB)

(MB) R3505887-1 03/06/20 06:20

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
COD	U		3.00	10.0

L1195115-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1195115-01 03/06/20 06:21 • (DUP) R3505887-3 03/06/20 06:21

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
COD	222	224	1	0.999		20

L1195627-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1195627-01 03/06/20 06:27 • (DUP) R3505887-6 03/06/20 06:27

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
COD	ND	0.000	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3505887-2 03/06/20 06:21

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
COD	222	229	103	90.0-110	

L1195274-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1195274-06 03/06/20 06:21 • (MS) R3505887-4 03/06/20 06:21 • (MSD) R3505887-5 03/06/20 06:22

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
COD	400	ND	433	429	108	107	1	80.0-120			1.02	20

Method Blank (MB)

(MB) R3505456-1 03/04/20 13:34

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Bromide	U		0.0790	1.00
Chloride	U		0.0519	1.00
Fluoride	U		0.00990	0.100
Nitrate	U		0.0227	0.100
Sulfate	U		0.0774	5.00

L1194794-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1194794-01 03/04/20 17:01 • (DUP) R3505456-3 03/04/20 17:16

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Bromide	ND	0.000	1	0.000		15
Chloride	12.5	12.5	1	0.125		15
Fluoride	0.708	0.698	1	1.31		15
Nitrate	5.71	5.64	1	1.26		15
Sulfate	13.9	13.9	1	0.260		15

Laboratory Control Sample (LCS)

(LCS) R3505456-2 03/04/20 13:49

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Bromide	40.0	39.7	99.2	80.0-120	
Chloride	40.0	39.1	97.7	80.0-120	
Fluoride	8.00	7.85	98.1	80.0-120	
Nitrate	8.00	7.90	98.8	80.0-120	
Sulfate	40.0	39.6	98.9	80.0-120	

L1195277-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1195277-01 03/04/20 17:46 • (MS) R3505456-4 03/04/20 18:02 • (MSD) R3505456-5 03/04/20 18:17

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Bromide	50.0	ND	48.4	49.0	96.8	98.1	1	80.0-120			1.35	15
Chloride	50.0	79.1	125	125	92.3	92.8	1	80.0-120	E	E	0.204	15
Fluoride	5.00	0.686	5.69	5.70	100	100	1	80.0-120			0.258	15
Nitrate	5.00	0.105	5.06	5.12	99.0	100	1	80.0-120			1.28	15
Sulfate	50.0	65.8	112	112	93.2	92.9	1	80.0-120	E	E	0.123	15

Method Blank (MB)

(MB) R3506073-1 03/06/20 11:39

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Mercury	U		0.0000490	0.000200

Laboratory Control Sample (LCS)

(LCS) R3506073-2 03/06/20 11:41

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Mercury	0.00300	0.00287	95.5	80.0-120	

L1195533-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1195533-01 03/06/20 11:43 • (MS) R3506073-3 03/06/20 11:45 • (MSD) R3506073-4 03/06/20 11:47

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Mercury	0.00300	U	0.00216	0.00217	72.2	72.2	1	75.0-125	J6	J6	0.0739	20

Method Blank (MB)

(MB) R3506842-1 03/09/20 14:33

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Mercury	U		0.0000490	0.000200

Laboratory Control Sample (LCS)

(LCS) R3506842-2 03/09/20 14:35

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Mercury	0.00300	0.00307	102	80.0-120	

L1196025-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1196025-01 03/09/20 14:37 • (MS) R3506842-3 03/09/20 15:26 • (MSD) R3506842-4 03/09/20 15:28

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Mercury	0.00300	ND	0.00300	0.00301	100	100	1	75.0-125			0.293	20

Method Blank (MB)

(MB) R3506407-1 03/06/20 20:45

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Boron	U		0.0126	0.200

Laboratory Control Sample (LCS)

(LCS) R3506407-2 03/06/20 20:48

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Boron	1.00	0.966	96.6	80.0-120	

L1195535-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1195535-01 03/06/20 20:51 • (MS) R3506407-4 03/06/20 20:56 • (MSD) R3506407-5 03/06/20 20:59

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Boron	1.00	0.0234	1.01	1.01	99.1	98.4	1	75.0-125			0.761	20

Method Blank (MB)

(MB) R3506918-1 03/09/20 19:51

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Boron	U		0.0126	0.200

Laboratory Control Sample (LCS)

(LCS) R3506918-2 03/09/20 19:53

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Boron	1.00	0.979	97.9	80.0-120	

L1196025-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1196025-01 03/09/20 19:56 • (MS) R3506918-4 03/09/20 20:01 • (MSD) R3506918-5 03/09/20 20:03

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Boron	1.00	ND	0.980	0.980	96.2	96.2	1	75.0-125			0.0000714	20

Method Blank (MB)

(MB) R3506101-1 03/06/20 12:18

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Aluminum	U		0.00515	0.100
Antimony	U		0.000754	0.00200
Arsenic	U		0.000250	0.00200
Barium	U		0.000360	0.00500
Beryllium	U		0.000120	0.00200
Cadmium	U		0.000160	0.00100
Calcium	U		0.0460	1.00
Chromium	U		0.000540	0.00200
Copper	U		0.000520	0.00500
Cobalt	U		0.000260	0.00200
Iron	U		0.0150	0.100
Lead	U		0.000240	0.00200
Magnesium	U		0.100	1.00
Manganese	U		0.000250	0.00500
Nickel	U		0.000350	0.00200
Potassium	U		0.0370	1.00
Selenium	U		0.000380	0.00200
Silver	U		0.000310	0.00200
Sodium	U		0.110	1.00
Thallium	U		0.000190	0.00200
Vanadium	U		0.000180	0.00500
Zinc	U		0.00256	0.0250

Laboratory Control Sample (LCS)

(LCS) R3506101-2 03/06/20 12:22

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Aluminum	5.00	4.92	98.5	80.0-120	
Antimony	0.0500	0.0486	97.2	80.0-120	
Arsenic	0.0500	0.0489	97.9	80.0-120	
Barium	0.0500	0.0478	95.6	80.0-120	
Beryllium	0.0500	0.0437	87.3	80.0-120	
Cadmium	0.0500	0.0509	102	80.0-120	
Calcium	5.00	4.94	98.9	80.0-120	
Chromium	0.0500	0.0504	101	80.0-120	
Copper	0.0500	0.0450	90.0	80.0-120	
Cobalt	0.0500	0.0501	100	80.0-120	
Iron	5.00	4.87	97.4	80.0-120	

Laboratory Control Sample (LCS)

(LCS) R3506101-2 03/06/20 12:22

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Lead	0.0500	0.0482	96.4	80.0-120	
Magnesium	5.00	5.06	101	80.0-120	
Manganese	0.0500	0.0498	99.6	80.0-120	
Nickel	0.0500	0.0496	99.1	80.0-120	
Potassium	5.00	4.95	99.0	80.0-120	
Selenium	0.0500	0.0491	98.2	80.0-120	
Silver	0.0500	0.0512	102	80.0-120	
Sodium	5.00	5.14	103	80.0-120	
Thallium	0.0500	0.0474	94.8	80.0-120	
Vanadium	0.0500	0.0494	98.9	80.0-120	
Zinc	0.0500	0.0510	102	80.0-120	

L1195775-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1195775-01 03/06/20 12:25 • (MS) R3506101-4 03/06/20 12:31 • (MSD) R3506101-5 03/06/20 12:35

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Aluminum	5.00	ND	4.96	4.81	98.3	95.2	1	75.0-125			3.13	20
Antimony	0.0500	0.00249	0.0519	0.0510	98.8	97.0	1	75.0-125			1.80	20
Arsenic	0.0500	ND	0.0504	0.0489	99.3	96.4	1	75.0-125			2.96	20
Barium	0.0500	0.0242	0.0723	0.0717	96.2	95.0	1	75.0-125			0.793	20
Beryllium	0.0500	ND	0.0465	0.0464	92.4	92.1	1	75.0-125			0.242	20
Cadmium	0.0500	ND	0.0516	0.0497	103	99.0	1	75.0-125			3.61	20
Calcium	5.00	2.61	7.62	7.35	100	94.8	1	75.0-125			3.65	20
Chromium	0.0500	0.00336	0.0538	0.0512	101	95.7	1	75.0-125			4.96	20
Copper	0.0500	0.00547	0.0504	0.0507	89.9	90.5	1	75.0-125			0.602	20
Cobalt	0.0500	0.00558	0.0565	0.0540	102	96.9	1	75.0-125			4.38	20
Potassium	5.00	2.51	7.37	7.19	97.1	93.5	1	75.0-125			2.48	20
Iron	5.00	0.297	5.16	4.91	97.3	92.3	1	75.0-125			4.96	20
Lead	0.0500	ND	0.0509	0.0517	101	103	1	75.0-125			1.59	20
Magnesium	5.00	1.15	6.17	6.06	100	98.1	1	75.0-125			1.89	20
Manganese	0.0500	0.396	0.443	0.426	93.8	60.2	1	75.0-125		V	3.87	20
Nickel	0.0500	0.00737	0.0587	0.0559	103	97.1	1	75.0-125			4.85	20
Selenium	0.0500	ND	0.0501	0.0504	100	101	1	75.0-125			0.659	20
Silver	0.0500	ND	0.0514	0.0499	103	99.9	1	75.0-125			2.82	20
Sodium	5.00	49.4	53.7	52.5	86.1	62.4	1	75.0-125		V	2.23	20
Thallium	0.0500	ND	0.0497	0.0500	99.4	100	1	75.0-125			0.608	20
Vanadium	0.0500	ND	0.0506	0.0487	100	96.6	1	75.0-125			3.78	20
Zinc	0.0500	0.0438	0.0917	0.0898	95.9	92.1	1	75.0-125			2.09	20

Method Blank (MB)

(MB) R3505882-1 03/05/20 23:30

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Aluminum	U		0.00515	0.100
Antimony	U		0.000754	0.00200
Arsenic	U		0.000250	0.00200
Barium	U		0.000360	0.00500
Beryllium	U		0.000120	0.00200
Cadmium	U		0.000160	0.00100
Calcium	U		0.0460	1.00
Chromium	U		0.000540	0.00200
Copper	U		0.000520	0.00500
Cobalt	U		0.000260	0.00200
Iron	U		0.0150	0.100
Lead	U		0.000240	0.00200
Magnesium	U		0.100	1.00
Manganese	U		0.000250	0.00500
Nickel	U		0.000350	0.00200
Potassium	U		0.0370	1.00
Selenium	U		0.000380	0.00200
Silver	U		0.000310	0.00200
Sodium	U		0.110	1.00
Thallium	U		0.000190	0.00200
Vanadium	U		0.000180	0.00500
Zinc	U		0.00256	0.0250

Laboratory Control Sample (LCS)

(LCS) R3505882-2 03/05/20 23:33

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Aluminum	5.00	4.77	95.4	80.0-120	
Antimony	0.0500	0.0467	93.3	80.0-120	
Arsenic	0.0500	0.0487	97.4	80.0-120	
Barium	0.0500	0.0472	94.4	80.0-120	
Beryllium	0.0500	0.0471	94.2	80.0-120	
Cadmium	0.0500	0.0493	98.7	80.0-120	
Calcium	5.00	4.80	96.0	80.0-120	
Chromium	0.0500	0.0506	101	80.0-120	
Copper	0.0500	0.0451	90.2	80.0-120	
Cobalt	0.0500	0.0493	98.6	80.0-120	
Iron	5.00	5.01	100	80.0-120	

Laboratory Control Sample (LCS)

(LCS) R3505882-2 03/05/20 23:33

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Lead	0.0500	0.0469	93.7	80.0-120	
Magnesium	5.00	4.87	97.3	80.0-120	
Manganese	0.0500	0.0497	99.4	80.0-120	
Nickel	0.0500	0.0504	101	80.0-120	
Potassium	5.00	4.90	98.0	80.0-120	
Selenium	0.0500	0.0491	98.3	80.0-120	
Silver	0.0500	0.0437	87.5	80.0-120	
Sodium	5.00	5.95	119	80.0-120	
Thallium	0.0500	0.0466	93.1	80.0-120	
Vanadium	0.0500	0.0496	99.2	80.0-120	
Zinc	0.0500	0.0478	95.6	80.0-120	

L1195533-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1195533-05 03/05/20 23:36 • (MS) R3505882-4 03/05/20 23:43 • (MSD) R3505882-5 03/05/20 23:46

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Aluminum	5.00	0.0665	4.81	4.75	94.9	93.6	1	75.0-125			1.30	20
Antimony	0.0500	U	0.0482	0.0476	96.4	95.2	1	75.0-125			1.23	20
Arsenic	0.0500	U	0.0495	0.0491	98.9	98.2	1	75.0-125			0.667	20
Barium	0.0500	0.0161	0.0644	0.0656	96.7	98.9	1	75.0-125			1.70	20
Beryllium	0.0500	U	0.0464	0.0451	92.7	90.1	1	75.0-125			2.86	20
Cadmium	0.0500	U	0.0488	0.0490	97.6	97.9	1	75.0-125			0.319	20
Calcium	5.00	18.3	22.9	22.9	91.6	90.3	1	75.0-125			0.274	20
Chromium	0.0500	0.00281	0.0520	0.0513	98.4	96.9	1	75.0-125			1.42	20
Copper	0.0500	0.0162	0.0607	0.0606	88.9	88.9	1	75.0-125			0.0399	20
Cobalt	0.0500	U	0.0491	0.0488	98.2	97.5	1	75.0-125			0.674	20
Potassium	5.00	1.56	6.42	6.32	97.1	95.2	1	75.0-125			1.46	20
Iron	5.00	0.0573	4.93	4.88	97.5	96.4	1	75.0-125			1.08	20
Lead	0.0500	U	0.0472	0.0480	94.5	95.9	1	75.0-125			1.49	20
Magnesium	5.00	3.04	7.79	7.68	95.1	92.9	1	75.0-125			1.41	20
Manganese	0.0500	0.0271	0.0763	0.0744	98.4	94.7	1	75.0-125			2.45	20
Nickel	0.0500	0.00133	0.0499	0.0498	97.2	96.9	1	75.0-125			0.331	20
Selenium	0.0500	0.00163	0.0517	0.0519	100	101	1	75.0-125			0.352	20
Silver	0.0500	U	0.0448	0.0444	89.7	88.7	1	75.0-125			1.06	20
Sodium	5.00	57.0	59.3	58.2	46.2	23.3	1	75.0-125	V	V	1.95	20
Thallium	0.0500	U	0.0469	0.0470	93.8	93.9	1	75.0-125			0.107	20
Vanadium	0.0500	0.000764	0.0503	0.0497	99.2	97.8	1	75.0-125			1.36	20
Zinc	0.0500	0.0567	0.104	0.103	94.8	92.0	1	75.0-125			1.37	20

Method Blank (MB)

(MB) R3507292-3 03/05/20 09:50

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Acetone	0.0265	J	0.0100	0.0500
Acrylonitrile	U		0.00187	0.0100
Benzene	U		0.000331	0.00100
Bromodichloromethane	U		0.000380	0.00100
Bromochloromethane	U		0.000520	0.00100
Bromoform	U		0.000469	0.00100
Bromomethane	U		0.000866	0.00500
Carbon tetrachloride	U		0.000379	0.00100
Chlorobenzene	U		0.000348	0.00100
Chlorodibromomethane	U		0.000327	0.00100
Chloroethane	U		0.000453	0.00500
Chloroform	U		0.000324	0.00500
Chloromethane	U		0.000276	0.00250
1,2-Dibromo-3-Chloropropane	U		0.00133	0.00500
1,2-Dibromoethane	U		0.000381	0.00100
Dibromomethane	U		0.000346	0.00100
1,2-Dichlorobenzene	U		0.000349	0.00100
1,4-Dichlorobenzene	U		0.000274	0.00100
trans-1,4-Dichloro-2-butene	U		0.000866	0.00250
1,1-Dichloroethane	U		0.000259	0.00100
1,2-Dichloroethane	U		0.000361	0.00100
1,1-Dichloroethene	U		0.000398	0.00100
cis-1,2-Dichloroethene	U		0.000260	0.00100
trans-1,2-Dichloroethene	U		0.000396	0.00100
1,2-Dichloropropane	U		0.000306	0.00100
cis-1,3-Dichloropropene	U		0.000418	0.00100
trans-1,3-Dichloropropene	U		0.000419	0.00100
Ethylbenzene	U		0.000384	0.00100
2-Hexanone	U		0.00382	0.0100
Iodomethane	U		0.00171	0.0100
2-Butanone (MEK)	U		0.00393	0.0100
Methylene Chloride	U		0.00100	0.00500
4-Methyl-2-pentanone (MIBK)	U		0.00214	0.0100
Styrene	U		0.000307	0.00100
1,1,1,2-Tetrachloroethane	U		0.000385	0.00100
1,1,2,2-Tetrachloroethane	U		0.000130	0.00100
Tetrachloroethene	U		0.000372	0.00100
Toluene	U		0.000412	0.00100
1,1,1-Trichloroethane	U		0.000319	0.00100
1,1,2-Trichloroethane	U		0.000383	0.00100

Method Blank (MB)

(MB) R3507292-3 03/05/20 09:50

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Trichloroethene	U		0.000398	0.00100
Trichlorofluoromethane	U		0.00120	0.00500
1,2,3-Trichloropropane	U		0.000807	0.00250
Vinyl acetate	U		0.00163	0.0100
Vinyl chloride	U		0.000259	0.00100
Xylenes, Total	U		0.00106	0.00300
(S) Toluene-d8	*105*			*80.0-120*
(S) 4-Bromofluorobenzene	*94.6*			*77.0-126*
(S) 1,2-Dichloroethane-d4	*104*			*70.0-130*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3507292-1 03/05/20 08:21 • (LCSD) R3507292-2 03/05/20 08:44

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Acetone	0.0250	0.0489	0.0489	196	196	19.0-160	J4	J4	0.000	27
Acrylonitrile	0.0250	0.0237	0.0252	94.8	101	55.0-149			6.13	20
Benzene	0.00500	0.00462	0.00484	92.4	96.8	70.0-123			4.65	20
Bromodichloromethane	0.00500	0.00523	0.00513	105	103	75.0-120			1.93	20
Bromochloromethane	0.00500	0.00538	0.00529	108	106	76.0-122			1.69	20
Bromoform	0.00500	0.00560	0.00529	112	106	68.0-132			5.69	20
Bromomethane	0.00500	0.00232	0.00261	46.4	52.2	10.0-160			11.8	25
Carbon tetrachloride	0.00500	0.00486	0.00524	97.2	105	68.0-126			7.52	20
Chlorobenzene	0.00500	0.00522	0.00519	104	104	80.0-121			0.576	20
Chlorodibromomethane	0.00500	0.00549	0.00578	110	116	77.0-125			5.15	20
Chloroethane	0.00500	0.00354	0.00385	70.8	77.0	47.0-150			8.39	20
Chloroform	0.00500	0.00490	0.00510	98.0	102	73.0-120			4.00	20
Chloromethane	0.00500	0.00363	0.00378	72.6	75.6	41.0-142			4.05	20
1,2-Dibromo-3-Chloropropane	0.00500	0.00650	0.00575	130	115	58.0-134			12.2	20
1,2-Dibromoethane	0.00500	0.00598	0.00607	120	121	80.0-122			1.49	20
Dibromomethane	0.00500	0.00563	0.00530	113	106	80.0-120			6.04	20
1,2-Dichlorobenzene	0.00500	0.00535	0.00543	107	109	79.0-121			1.48	20
1,4-Dichlorobenzene	0.00500	0.00568	0.00573	114	115	79.0-120			0.876	20
trans-1,4-Dichloro-2-butene	0.00500	0.00532	0.00560	106	112	33.0-144			5.13	20
1,1-Dichloroethane	0.00500	0.00472	0.00495	94.4	99.0	70.0-126			4.76	20
1,2-Dichloroethane	0.00500	0.00487	0.00487	97.4	97.4	70.0-128			0.000	20
1,1-Dichloroethene	0.00500	0.00417	0.00509	83.4	102	71.0-124			19.9	20
cis-1,2-Dichloroethene	0.00500	0.00494	0.00534	98.8	107	73.0-120			7.78	20
trans-1,2-Dichloroethene	0.00500	0.00566	0.00632	113	126	73.0-120		J4	11.0	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3507292-1 03/05/20 08:21 • (LCSD) R3507292-2 03/05/20 08:44

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
1,2-Dichloropropane	0.00500	0.00455	0.00519	91.0	104	77.0-125			13.1	20
cis-1,3-Dichloropropene	0.00500	0.00437	0.00454	87.4	90.8	80.0-123			3.82	20
trans-1,3-Dichloropropene	0.00500	0.00477	0.00481	95.4	96.2	78.0-124			0.835	20
Ethylbenzene	0.00500	0.00517	0.00509	103	102	79.0-123			1.56	20
2-Hexanone	0.0250	0.0211	0.0212	84.4	84.8	67.0-149			0.473	20
Iodomethane	0.0250	0.00771	0.0105	30.8	42.0	33.0-147	J4	J3	30.6	26
2-Butanone (MEK)	0.0250	0.0233	0.0240	93.2	96.0	44.0-160			2.96	20
Methylene Chloride	0.00500	0.00451	0.00502	90.2	100	67.0-120			10.7	20
4-Methyl-2-pentanone (MIBK)	0.0250	0.0252	0.0252	101	101	68.0-142			0.000	20
Styrene	0.00500	0.00388	0.00391	77.6	78.2	73.0-130			0.770	20
1,1,1,2-Tetrachloroethane	0.00500	0.00510	0.00542	102	108	75.0-125			6.08	20
1,1,2,2-Tetrachloroethane	0.00500	0.00547	0.00566	109	113	65.0-130			3.41	20
Tetrachloroethene	0.00500	0.00549	0.00537	110	107	72.0-132			2.21	20
Toluene	0.00500	0.00498	0.00508	99.6	102	79.0-120			1.99	20
1,1,1-Trichloroethane	0.00500	0.00505	0.00499	101	99.8	73.0-124			1.20	20
1,1,2-Trichloroethane	0.00500	0.00559	0.00612	112	122	80.0-120		J4	9.05	20
Trichloroethene	0.00500	0.00513	0.00506	103	101	78.0-124			1.37	20
Trichlorofluoromethane	0.00500	0.00465	0.00512	93.0	102	59.0-147			9.62	20
1,2,3-Trichloropropane	0.00500	0.00533	0.00568	107	114	73.0-130			6.36	20
Vinyl acetate	0.0250	0.0241	0.0243	96.4	97.2	11.0-160			0.826	20
Vinyl chloride	0.00500	0.00435	0.00465	87.0	93.0	67.0-131			6.67	20
Xylenes, Total	0.0150	0.0142	0.0151	94.7	101	79.0-123			6.14	20
(S) Toluene-d8				*102*	*106*	*80.0-120*				
(S) 4-Bromofluorobenzene				*95.5*	*95.6*	*77.0-126*				
(S) 1,2-Dichloroethane-d4				*97.4*	*101*	*70.0-130*				

Method Blank (MB)

(MB) R3507478-3 03/10/20 21:08

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Carbon disulfide	U		0.000275	0.00100
(S) Toluene-d8	*99.6*			*80.0-120*
(S) 4-Bromofluorobenzene	*104*			*77.0-126*
(S) 1,2-Dichloroethane-d4	*90.2*			*70.0-130*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3507478-1 03/10/20 19:47 • (LCSD) R3507478-2 03/10/20 20:07

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Carbon disulfide	0.00500	0.00502	0.00488	100	97.6	61.0-128			2.83	20
(S) Toluene-d8				*101*	*101*	*80.0-120*				
(S) 4-Bromofluorobenzene				*105*	*105*	*77.0-126*				
(S) 1,2-Dichloroethane-d4				*90.5*	*89.6*	*70.0-130*				

Method Blank (MB)

(MB) R3506432-1 03/06/20 23:36

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Ethylene Dibromide	U		0.00000240	0.0000100
1,2-Dibromo-3-Chloropropane	U		0.00000430	0.0000200

L1195357-05 Original Sample (OS) • Duplicate (DUP)

(OS) L1195357-05 03/07/20 00:23 • (DUP) R3506432-3 03/07/20 00:12

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Ethylene Dibromide	U	0.000	1	0.000		20
1,2-Dibromo-3-Chloropropane	U	0.000	1	0.000		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3506432-4 03/07/20 02:24 • (LCSD) R3506432-5 03/07/20 05:07

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Ethylene Dibromide	0.000250	0.000234	0.000241	93.6	96.4	60.0-140			2.95	20
1,2-Dibromo-3-Chloropropane	0.000250	0.000250	0.000258	100	103	60.0-140			3.15	20

L1195357-06 Original Sample (OS) • Matrix Spike (MS)

(OS) L1195357-06 03/07/20 00:00 • (MS) R3506432-2 03/06/20 23:48

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Ethylene Dibromide	0.000100	U	0.000107	107	1	64.0-159	
1,2-Dibromo-3-Chloropropane	0.000100	U	0.000114	114	1	72.0-148	

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state “ND” (Not Detected) or “BDL” (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
B	The same analyte is found in the associated blank.
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL).
J	The identification of the analyte is acceptable; the reported value is an estimate.
J3	The associated batch QC was outside the established quality control range for precision.
J4	The associated batch QC was outside the established quality control range for accuracy.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.
V	The sample concentration is too high to evaluate accurate spike recoveries.

Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.
* Not all certifications held by the laboratory are applicable to the results reported in the attached report.
* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	n/a
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina [1]	DW21704
Georgia	NELAP	North Carolina [3]	41
Georgia [1]	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LAO00356
Kentucky [1 6]	90010	South Carolina	84004
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1 4]	2006
Louisiana [1]	LA180010	Texas	T104704245-18-15
Maine	TN0002	Texas [5]	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

Third Party Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.

Civil & Environmental Consultants - TN

117 Seaboard Ln.

Billing Information:
Dr. Kevin Wolfe
117 Seaboard Ln.
Suite E100
Franklin, TN 37067

Email To: pcampbell@cecinc.com

Report to: Philip Campbell

Project Description: EWS Camden Class 2 Landfill

City/State Collected: Camden, TN

Please Circle: PT MT CT ET

Phone: 615-333-7797
Fax: 615-333-7751

Client Project # 181-364

Lab Project # CEC-181364

Collected by (print): Todd Hughes

Site/Facility ID # CAMDEN, TN

P.O. #

Collected by (signature):

Quote #

Immediately Packed on Ice N ___ Y X

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Date Results Needed

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	**WetChem** 250mlHDPE-NoPres x2	ALK 100ml Amb-NoPres	COD,NH3 250mlHDPE-H2SO4	Dis Metals 250mlHDPE-NoPres	SV8011 40mlClr-NaThio	Total Metals,HARD 250mlHDPE-HNO3	V8260AP1 40mlAmb-HCl			Remarks	Sample # (lab only)
IWC-L	Grab	GW	~~3~~	3/3/20	1420	10	X	X	X	X	X	X	X				-01
APWC-L	Grab	GW	~~3~~	3/3/20	1306	10	X	X	X	X	X	X	X				02

Analysis / Container / Preservative

Chain of Custody Page ___ of ___

Pace Analytical® National Center for Testing & Innovation

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

SDG # L1145591

C201

Acctnum: CEC
Template: T133582
Prelogin: P757607
PM: 526 - Chris McCord
PB 2/24/20 MB
Shipped Via: Courier

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other

Remarks: **WetChem** = *NITRATE*,CHLORIDE,BROMIDE,SULFATE,FLUORIDE
Tot/Diss Metals=M6020AP1 + Al,Ca,Fe,K,Mg,Mn,Na,B(6010)

pH ___ Temp ___
Flow ___ Other ___

Samples returned via: __ UPS __ FedEx __ Courier X

Tracking #

Sample Receipt Checklist
COC Seal Present/Intact: NP Y N
COC Signed/Accurate: Y N
Bottles arrive intact: Y N
Correct bottles used: Y N
Sufficient volume sent: Y N
If Applicable
VOA Zero Headspace: Y N
Preservation Correct/Checked: Y N
RAD Screen <0.5 mR/hr: Y N

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCl / MeoH TBR	If preservation required by Login: Date/Time
	3/3/20	1650		1	
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Temp: 3.1+1=4.1 °C	Bottles Received: 12
	3/4/20	11:26			
Relinquished by: (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: 3/4/20	Time: 15:00
	3/4/20	15:00			Hold: Condition: NCF / OK

GROUNDWATER MONITORING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 117 Seaboard Lane, Suite E100 Franklin, Tennessee 37067 - 800-763-2326 - www.cecinc.com

SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	**MONITORING WELL I.D.**	MW-1
LOCATION	Camden, TN	**TEMPERATURE & WEATHER**	Clear ; 40s
DATE & TIME	2-27-20 1020	**EVENT FREQUENCY**	Quarterly
PURGE METHOD	-Low-Flow	**FIELD REPRESENTATIVE**	A. Baugh / P. Campbell
TOTAL WELL DEPTH (feet)	30.5	**SAMPLING EQUIPMENT**	Bladder Pump
DEPTH TO WATER (feet)	20.52	**IS SAMPLE EQUIPMENT DEDICATED?**	Yes
CASING DIAMETER (inches)	2	**DUPLICATE COLLECTED?**	N
WATER COLUMN (feet)	9.98	**FIELD BLANK COLLECTED?**	N
PURGE VOLUME (gallons)	2.5	**EQUIPMENT BLANK COLLECTED?**	N

PURGE INFORMATION

Gallons Purged	DTW (ft)	Time (00:00)	°C	pH	Specific Cond (µs/cm)	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
Ø	20.52	1035	10.6	4.50	133.3	98.2	7.46	281.0	7.31
.5	21.71	1039	14.4	4.88	57.4	45.9	4.40	210.1	7.63
.75	21.61	1043	14.5	4.98	60.5	48.8	3.86	176.1	6.63
1.0	21.61	1047	14.5	5.10	72.4	58.0	2.87	123.8	6.58
1.25	21.61	1051	14.5	5.21	87.8	70.3	2.29	92.7	7.31
1.5	21.61	1055	14.4	5.27	98.0	78.1	1.98	74.3	6.93
2.0	21.61	1059	14.5	5.35	107.1	85.6	1.64	59.0	6.75
2.5	21.61	1103	14.5	5.39	121.1	96.6	1.28	43.4	6.74

SAMPLE DATA

Gallons Purged	DTW (ft)	Time (00:00)	°C	pH	Specific Cond (µs/cm)	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
2.5	21.61	1105	14.5	5.39	121.1	96.6	1.28	43.4	6.74

Preservatives Used	See COC	**Sample Charateristics (Odor, Color)**	Clear ; odorless
Number of Containers	10	**Sampler Signature**	A. Baugh

WELL DATA

Number of Baffles	4 + gate	**Well Cap Dedicated/In Place?**	yes
Lock Condition	good	**Fittings/Well Head Condition**	good
Pad/Casing Quality	good	**Well Clear of Weeds/Accessible?**	yes

GROUNDWATER MONITORING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 117 Seaboard Lane, Suite E100 Franklin, Tennessee 37067 - 800-763-2326 - www.cecinc.com

SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	**MONITORING WELL I.D.**	MW-2
LOCATION	Camden, TN	**TEMPERATURE & WEATHER**	Clear ; 40s
DATE & TIME	2-27-20 1230	**EVENT FREQUENCY**	Quarterly
PURGE METHOD	NA, parameters only	**FIELD REPRESENTATIVE**	A. Baugh
TOTAL WELL DEPTH (feet)	10	**SAMPLING EQUIPMENT**	Bailer
DEPTH TO WATER (feet)	4.67	**IS SAMPLE EQUIPMENT DEDICATED?**	No
CASING DIAMETER (Inches)	2	**DUPLICATE COLLECTED?**	N
WATER COLUMN (feet)	5.33	**FIELD BLANK COLLECTED?**	N
PURGE VOLUME (gallons)		**EQUIPMENT BLANK COLLECTED?**	N

SAMPLE DATA

Gallons Purged	DTW (ft)	Time (00:00)	°C	pH	Specific Cond (µs/cm)	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
0	4.67	1235	10.1	5.86	470.1	336.2	2.85	164.4	1.01

Preservatives Used	N/A	**Sample Charateristics (Odor, Color)**	N/A
Number of Containers	NONE	**Sampler Signature**	A Baugh

WELL DATA

Number of Baffles	4 (1 closer to road slightly bent)	**Well Cap Dedicated/In Place?**	No
Lock Condition	good	**Fittings/Well Head Condition**	N/A
Pad/Casing Quality	fair	**Well Clear of Weeds/Accessible?**	yes

GROUNDWATER MONITORING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 117 Seaboard Lane, Suite E100 Franklin, Tennessee 37067 - 800-763-2326 - www.cecinc.com

SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	MONITORING WELL I.D.	MW-3
LOCATION	Camden, TN	TEMPERATURE & WEATHER	Clear 40s
DATE & TIME	2-27-20 1325	EVENT FREQUENCY	Quarterly
PURGE METHOD	Low-flow	FIELD REPRESENTATIVE	A. Baugh / P. Campbell
TOTAL WELL DEPTH (feet)	27	SAMPLING EQUIPMENT	Bladder Pump
DEPTH TO WATER (feet)	17.03	IS SAMPLE EQUIPMENT DEDICATED?	Yes
CASING DIAMETER (Inches)	2	DUPLICATE COLLECTED?	Yes
WATER COLUMN (feet)	9.97	FIELD BLANK COLLECTED?	Yes
PURGE VOLUME (gallons)	1.5	EQUIPMENT BLANK COLLECTED?	N

PURGE INFORMATION

Gallons Purged	DTW (ft)	Time (00:00)	°C	pH	Specific Cond (µs/cm)	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
0	17.03	1331	12.8	4.99	294.7	225.1	1.90	181.3	16.0
.75	17.21	1335	12.5	4.99	298.8	222.6	.92	177.4	8.01
1.0	17.21	1339	12.4	5.03	292.0	221.5	.91	176.2	7.46
1.25	17.21	1343	12.4	5.12	284	215.9	.85	173.8	7.54
1.5	17.21	1347	12.3	5.11	282.1	213.8	.84	173.8	7.63

SAMPLE DATA

Gallons Purged	DTW (ft)	Time (00:00)	°C	pH	Specific Cond (µs/cm)	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
1.5	17.21	1350	12.3	5.11	282.1	213.8	.84	173.8	7.63

Preservatives Used	See COC	Sample Charateristics (Odor, Color)	Clear
Number of Containers	10	Sampler Signature	A Baugh

WELL DATA

Number of Baffles	4	Well Cap Dedicated/In Place?	Yes
Lock Condition	good	Fittings/Well Head Condition	Good
Pad/Casing Quality	fair	Well Clear of Weeds/Accessible?	~~Good~~ Yes

GROUNDWATER MONITORING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 117 Seaboard Lane, Suite E100 Franklin, Tennessee 37067 - 800-763-2326 - www.cecinc.com

SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	MONITORING WELL I.D.	MW-4
LOCATION	Camden, TN	TEMPERATURE & WEATHER	Clear 40s
DATE & TIME	2-27-2020 1240	EVENT FREQUENCY	Quarterly
PURGE METHOD	Low-flow	FIELD REPRESENTATIVE	A. Baugh / D. Campbell
TOTAL WELL DEPTH (feet)	23.1	SAMPLING EQUIPMENT	Bladder Pump
DEPTH TO WATER (feet)	9.83	IS SAMPLE EQUIPMENT DEDICATED?	Yes
CASING DIAMETER (inches)	2	DUPLICATE COLLECTED?	N
WATER COLUMN (feet)	13.22	FIELD BLANK COLLECTED?	N
PURGE VOLUME (gallons)	1.5	EQUIPMENT BLANK COLLECTED?	N

PURGE INFORMATION

Gallons Purged	DTW (ft)	Time (00:00)	°C	pH	Specific Cond (µs/cm)	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
0	9.83	1251	13.9	5.69	85.4	67.1	3.36	147.0	14.7
.6	9.90	1255	14.1	5.60	78.5	62.2	2.70	145.1	5.15
1.0	9.90	1259	14.2	5.56	77.6	61.7	2.60	147.6	2.05
1.25	9.90	1303	14.0	5.57	77.8	61.5	2.56	148.0	1.68
1.5	9.90	1307	14.2	5.55	77.6	61.5	2.60	144.2	1.26

SAMPLE DATA

Gallons Purged	DTW (ft)	TIme (00:00)	°C	pH	Specific Cond (µs/cm)	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
1.5	9.90	1310	14.2	5.55	77.6	61.5	2.66	149.7	1.26

Preservatives Used	See COC	Sample Charateristics (Odor, Color)	Clear
Number of Containers	10	Sampler Signature	A Baugh

WELL DATA

Number of Baffles	0	Well Cap Dedicated/In Place?	Yes
Lock Condition	good	Fittings/Well Head Condition	good
Pad/Casing Quality	good	Well Clear of Weeds/Accessible?	Yes

GROUNDWATER MONITORING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 117 Seaboard Lane, Suite E100 Franklin, Tennessee 37067 - 800-763-2326 - www.cecinc.com

SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	MONITORING WELL I.D.	MW-5
LOCATION	Camden, TN	TEMPERATURE & WEATHER	Clear 40s
DATE & TIME	2-27-20 1130	EVENT FREQUENCY	Quarterly
PURGE METHOD	Low-flow	FIELD REPRESENTATIVE	A. Baugh / D. Campbell
TOTAL WELL DEPTH (feet)	33.85	SAMPLING EQUIPMENT	Bladder Pump
DEPTH TO WATER (feet)	8.21	IS SAMPLE EQUIPMENT DEDICATED?	Yes
CASING DIAMETER (inches)	2	DUPLICATE COLLECTED?	N
WATER COLUMN (feet)	25.64	FIELD BLANK COLLECTED?	N
PURGE VOLUME (gallons)		EQUIPMENT BLANK COLLECTED?	N

PURGE INFORMATION

Gallons Purged	DTW (ft)	Time (00:00)	°C	pH	Specific Cond (µs/cm)	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
0	8.21	1143	15.6	5.01	422.3	346.6	1.87	107.3	8.86
.6	8.99	1147	15.4	5.07	406.8	335.9	1.16	119.4	15.1
1.25	9.01	1151	15.8	5.05	396.4	327.3	1.08	131.7	13.8
1.5	9.01	1155	15.1	5.06	393.3	325.3	1.10	139.7	13.0
1.9	9.01	1159	15.4	5.06	390.4	322.5	1.09	138.8	10.7
2.25	9.01	1203	15.7	5.07	388.1	319.2	1.06	142.5	9.19

SAMPLE DATA

Gallons Purged	DTW (ft)	Time (00:00)	°C	pH	Specific Cond (µs/cm)	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
2.25	9.01	12:05	15.7	5.07	388.1	319.2	1.06	142.5	9.19

Preservatives Used	See COC	Sample Charateristics (Odor, Color)	Clear
Number of Containers	10	Sampler Signature	A. Baugh

WELL DATA

Number of Baffles	4	Well Cap Dedicated/In Place?	Yes
Lock Condition	Good	Fittings/Well Head Condition	Good
Pad/Casing Quality	Good	Well Clear of Weeds/Accessible?	Yes

GROUNDWATER MONITORING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 117 Seaboard Lane, Suite E100 Franklin, Tennessee 37067 - 800-763-2326 - www.cecinc.com

SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	**MONITORING WELL I.D.**	TMW-1
LOCATION	Camden, TN	**TEMPERATURE & WEATHER**	Clear, 40°F
DATE & TIME	2-27-20 / 10:20	**EVENT FREQUENCY**	Quarterly
PURGE METHOD	Low-flow & 3 volumes	**FIELD REPRESENTATIVE**	Philip Campbell
TOTAL WELL DEPTH (feet)	32.50	**SAMPLING EQUIPMENT**	~~Bladder Pump~~ Peristaltic
DEPTH TO WATER (feet)	5.19	**IS SAMPLE EQUIPMENT DEDICATED?**	Yes
CASING DIAMETER (Inches)	2	**DUPLICATE COLLECTED?**	No
WATER COLUMN (feet)	27.31	**FIELD BLANK COLLECTED?**	No
PURGE VOLUME (gallons)	1 vol ≈ 1.12 3 vol ≈ 3.36	**EQUIPMENT BLANK COLLECTED?**	No

PURGE INFORMATION

Gallons Purged	DTW (ft)	Time (00:00)	°C	pH	Specific Cond (µs/cm)	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
0	5.29	10:57	12.7	4.84	121.9	99.5	4.96	73.1	196
1.0	6.13	11:02	13.5	5.42	132.7	103.5	4.35	46.6	>1000
2.0	7.65	11:10	13.7	5.51	133.6	103.6	4.08	42.7	>1000
3.0	8.48	11:20	13.6	5.54	132.2	103.2	4.21	38.1	>1000
4.0	9.95	11:30	13.9	5.50	132.0	103.1	4.31	37.3	>1000
5.0	10.11	1140	14.1	5.52	134.6	103.7	4.34	31.1	>1000
stop purge	for 10 minutes								
6.6	7.27	12:00	13.6	5.38	130.2	102.3	4.16	38.3	210
7.0	8.13	12:10	12.8	5.47	136.0	104.1	3.99	37.5	150
8.0	9.12	12:20	13.7	5.48	128.7	101.8	3.99	34.3	48
9.6	10.05	12:30	13.6	5.49	129.6	103.0	3.49	33.2	48.9

SAMPLE DATA

Gallons Purged	DTW (ft)	Time (00:00)	°C	pH	Specific Cond (µs/cm)	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
9.0	10.05	12:40	13.6	5.49	129.5	103.1	3.47	33.1	49.2

(@ metals sample IC

Preservatives Used	see COC	**Sample Charateristics (Odor, Color)**	slight orange tint & very fine particulates
Number of Containers	10	**Sampler Signature**	Philip Campbell

WELL DATA

Number of Baffles	- Jersey Barrier	**Well Cap Dedicated/In Place?**	stick up PVC only,
Lock Condition	NA - Fenced,	**Fittings/Well Head Condition**	well seal only - OK
Pad/Casing Quality	OK / No casing	**Well Clear of Weeds/Accessible?**	yes

GROUNDWATER MONITORING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 117 Seaboard Lane, Suite E100 Franklin, Tennessee 37067 - 800-763-2326 - www.cecinc.com

SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	**MONITORING WELL I.D.**	TMW-2
LOCATION	Camden, TN	**TEMPERATURE & WEATHER**	Clear, 40's F
DATE & TIME	2-27-20 / 13:00	**EVENT FREQUENCY**	Quarterly
PURGE METHOD	Low-flow + 3 volumes +	**FIELD REPRESENTATIVE**	Philip Campbell
TOTAL WELL DEPTH (feet)	27.50	**SAMPLING EQUIPMENT**	~~Bladder Pump~~ Peristaltic Pump
DEPTH TO WATER (feet)	11.72	**IS SAMPLE EQUIPMENT DEDICATED?**	~~Yes~~ No
CASING DIAMETER (Inches)	2	**DUPLICATE COLLECTED?**	No
WATER COLUMN (feet)	15.78	**FIELD BLANK COLLECTED?**	~~No~~ Yes 1445
PURGE VOLUME (gallons)	1 vol ≈ 0.65 gallons 3 vol ≈ 1.0 gallons	**EQUIPMENT BLANK COLLECTED?**	No

PURGE INFORMATION

Gallons Purged	DTW (ft)	TIme (00:00)	°C	pH	Specific Cond (µs/cm)	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
0	13.05	13:25	13.8	5.55	153.5	124.4	5.06	41.4	>1000
1.0	14.16	13:35	14.0	5.50	152.1	122.3	4.93	40.8	>1000
2.0	15.08	1345	13.6	5.41	153.1	124.1	4.04	41.5	528
2.5	15.43	13:55	13.4	5.38	162.7	126.7	4.55	40.3	226
3.0	15.52	14:05	13.1	5.42	161.3	126.9	4.08	37.2	98.7
3.5	15.54	14:15	13.2	5.39	161.5	127.4	4.76	37.6	50.0
4.0	15.59	14:25	13.2	5.45	162.3	128.1	4.70	38.7	50.8

SAMPLE DATA

Gallons Purged	DTW (ft)	Time (00:00)	°C	pH	Specific Cond (µs/cm)	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
4.0	15.59	1430	13.2	5.45	162.3	128.1	4.70	38.7	25.2 - @ metals
Preservatives Used	HCl, HNO_3, Nothing, H_2SO_4			**Sample Charateristics (Odor, Color)**			clear, No odor		
Number of Containers	10			**Sampler Signature**			Philip Campbell		

WELL DATA

Number of Baffles	Jersey Barrier	**Well Cap Dedicated/In Place?**	Well cap OK
Lock Condition	No lock	**Fittings/Well Head Condition**	OK (PVC stick up only)
Pad/Casing Quality	No pad / PVC OK	**Well Clear of Weeds/Accessible?**	yes

GROUNDWATER MONITORING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 117 Seaboard Lane, Suite E100 Franklin, Tennessee 37067 - 800-763-2326 - www.cecinc.com

SITE AND MONITORING WELL DATA

FACILITY NAME	EWS	**MONITORING WELL I.D.**	TMW-3
LOCATION	Camden, TN	**TEMPERATURE & WEATHER**	clear 40s
DATE & TIME	2-27-20 1445	**EVENT FREQUENCY**	Quarterly
PURGE METHOD	Low-flow	**FIELD REPRESENTATIVE**	A. Baugh / D. Campbell
TOTAL WELL DEPTH (feet)	28.00	**SAMPLING EQUIPMENT**	Bladder Pump
DEPTH TO WATER (feet)	8.62	**IS SAMPLE EQUIPMENT DEDICATED?**	Yes
CASING DIAMETER (Inches)	2	**DUPLICATE COLLECTED?**	N
WATER COLUMN (feet)	19.38	**FIELD BLANK COLLECTED?**	N
PURGE VOLUME (gallons)	3.6	**EQUIPMENT BLANK COLLECTED?**	N

PURGE INFORMATION

Gallons Purged	DTW (ft)	Time (00:00)	°C	pH	Specific Cond (µs/cm)	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
0	8.68	1500	14.2	5.14	342.3	276.0	.69	35.8	OR
1.0	8.69	1510	14.2	5.21	320.0	254.0	.98	19.4	843
1.8	8.74	1520	14.3	5.20	320.4	254.8	.99	14.3	199
2.6	8.74	1530	14.3	5.18	319.4	254.8	1.00	12.0	49.8
3.6	8.74	1540	14.3	5.19	318.4	253.8	1.00	10.1	26.0

SAMPLE DATA

Gallons Purged	DTW (ft)	Time (00:00)	°C	pH	Specific Cond (µs/cm)	Conductivity (µs/cm)	DO (mg/L)	ORP	NTU
3.6	8.74	1545	14.3	5.19	318.4	253.8	1.00	10.1	16.7 @ Metals

Preservatives Used	See COC	**Sample Charateristics (Odor, Color)**	Gandy
Number of Containers	10	**Sampler Signature**	A Baugh

WELL DATA

Number of Baffles	Jersey barrier	**Well Cap Dedicated/In Place?**	yes
Lock Condition	fair	**Fittings/Well Head Condition**	fair
Pad/Casing Quality	PVC casing 2/3 broken near ground surface	**Well Clear of Weeds/Accessible?**	yes

EQUIPMENT CALIBRATION LOG

Civil & Environmental Consultants, Inc. 329 Seaboard Lane, Ste 170 Franklin, Tennessee 37067 - 800-763-2326 - www.cecinc.com

EQUIPMENT CALIBRATION FORM

NAME OF REPRESENTATIVE	A. Baugh
LOCATION	Former EWS
DATE AND TIME	2/26/20 1630
Equipment and Model # (ex. YSI Pro Plus 556)	YSI Pro Plus
Equipment Serial #	

pH Calibration							
pH buffer Calibration Standard	Buffer solution exp. date	Pre-Cal Reading (S.U.)	ph mV Value	Accepted Range mV	Within Range? (Yes or No)	Post-Cal Reading (S.U.)	Calibrated? (yes/no)
4	4/23	4.16	111.3	160 to 180	N	4.00	Y
7	7/21	7.30	-59.1	+/-50	Y	7.00	Y
10	6/20	10.33	-227.7	-160 to -180	N	10.00	Y

Temperature Calibration Check	
Cert. Thermometer Value (deg C)	Meter Value (deg C)
20.1	20.2

DO Calibration				
Actual Barometric Pressure	Barometric Pressure (mm Hg)	D.O. Value (% Saturated)	Unit reading (%)	% DO accepted?
763.8	763.8	100	97.1	Y

Specific Conductivity Calibration				ORP Calibration			
Sp. Conductivity Calibration Standard buffer solution	Buffer solution exp. date	Pre Cal Reading (umhos)	Post Cal Reading (umhos)	ORP Calibration (mV)	Buffer solution exp. date	Pre Cal Reading (mV)	Post Cal Reading (mV)
1.413 mS/cm	3/20	1380	1413	240	8/20	233.7	240.0

Hach Model 2100P Turbidimeter Calibration					
Calibration verification Test performed and passed?	NTU Standard	Within Range? (Yes/No)	Measured Value	Stored?	Final Verification test passed? (Yes/No)
Yes	20				
No	100				
Note: if verification passed, calibration not required	800				

Civil & Environmental Consultants - TN

117 Seaboard Ln.

Billing Information:
Dr. Kevin Wolfe
117 Seaboard Ln.
Suite E100
Franklin, TN 37067

Report to: **Philip Campbell**

Email To: **pcampbell@cecinc.com**

Project Description: **Former EWS Camden Class 2 La**

City/State Collected: Camden, TN

Please Circle: PT MT CT ET

Phone: **615-333-7797**
Fax: **615-333-7751**

Client Project # **181-364**

Lab Project # **CEC-181364**

Collected by (print): Adrian Campbell/Baugh

Site/Facility ID # **CAMDEN, TN**

P.O. #

Collected by (signature): Philip Campbell

Immediately Packed on Ice N ____ Y ____

Rush? (Lab MUST be Notified)
____ Same Day ____ Five Day
____ Next Day ____ 5 Day (Rad Only)
____ Two Day ____ 10 Day (Rad Only)
____ Three Day

Quote #

Date Results Needed

Pres Chk

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	**WetChem** 250mlHDPE-NoPres	ALK 100ml Amb-NoPres	COD,NH3 250mlHDPE-H2SO4	Diss. Metals-FF 250mlHDPE-HNO3	SV8011 40mlClr-NaThio	Total Metals,HARD 250mlHDPE-HNO3	V8260AP1 40mlAmb-HCl	V8260AP1-Trip Blank 40mlAmb-HCl-Blk			Remarks	Sample # (lab only)
MW-1	Grab	GW	-	2-27-20	11:05	10	X	X	X	X	X	X	X					
MW-3		GW	-		13:50	10	X	X	X	X	X	X	X					
MW-4		GW	-		13:10	10	X	X	X	X	X	X	X					
MW-5		GW	-		12:05	10	X	X	X	X	X	X	X					
TMW-1		GW	-		12:40	10	X	X	X	X	X	X	X					
TMW-2		GW	-		14:30	10	X	X	X	X	X	X	X					
TMW-3		GW	-		15:45	10	X	X	X	X	X	X	X					
DUPLICATE		GW	-			10	X	X	X	X	X	X	X					
FIELD BLANK		GW	-		14:45	10	X	X	X		X	X	X					
~~EQUIPMENT BLANK~~		~~GW~~				10	X	X	X		X	X	X					

Chain of Custody Page 1 of 2

Pace Analytical® National Center for Testing & Innovation

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

SDG #

Table #

Acctnum: **CEC**
Template: **T133579**
Prelogin: **P757606**
PM: **526 - Chris McCord**
PB:

Shipped Via: **Courier**

* Matrix:
SS - Soil **AIR** - Air **F** - Filter
GW - Groundwater **B** - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks:**WetChem** = *NITRATE*,CHLORIDE,BROMIDE,SULFATE,FLUORIDE**
Tot/Diss Metals=M6020AP1+Al,Ca,Fe,K,Mg,Mn,Na,B(6010/7470).
only Total Metals analysis

pH _____ Temp _____

Flow _____ Other _____

Samples returned via:
__ UPS __ FedEx X Courier

Tracking #

Sample Receipt Checklist
COC Seal Present/Intact: __NP __Y __N
COC Signed/Accurate: __Y __N
Bottles arrive intact: __Y __N
Correct bottles used: __Y __N
Sufficient volume sent: __Y __N
If Applicable
VOA Zero Headspace: __Y __N
Preservation Correct/Checked: __Y __N
RAD Screen <0.5 mR/hr: __Y __N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCL / MeoH TBR	If preservation required by Login: Date/Time
Philip Campbell	2/28/20	10:00			
Relinquished by : (Signature)	Date: 2/28/20	Time: 11:	Received by: (Signature)	Temp: °C Bottles Received:	
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: Time:	Hold: / Condition: NCF / OK

Civil & Environmental Consultants - TN

117 Seaboard Ln.

Billing Information:
Dr. Kevin Wolfe
117 Seaboard Ln.
Suite E100
Franklin, TN 37067

Pres Chk

Report to: **Philip Campbell**

Email To: **pcampbell@cecinc.com**

Project Description: **Former EWS Camden Class 2 La**

City/State Collected: Camden, TN

Please Circle: PT MT CT ET

Phone: **615-333-7797**
Fax: **615-333-7751**

Client Project # **181-364**

Lab Project # **CEC-181364**

Collected by (print): Philip Campbell / Bergh

Site/Facility ID # **CAMDEN, TN**

P.O. #

Collected by (signature): Philip J. Campbell

Immediately
Packed on Ice N ___ Y ___

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

No. of Cntrs

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	**WetChem** 250mlHDPE-NoPres	ALK 100ml Amb-NoPres	COD,NH3 250mlHDPE-H2SO4	Diss. Metals-FF 250mlHDPE-HNO3	SV8011 40mlClr-NaThio	Total Metals,HARD 250mlHDPE-HNO3	V8260AP1 40mlAmb-HCl	V8260AP1-Trip Blank 40mlAmb-HCl-Blk			Remarks	Sample # (lab only)
TRIP BLANK	—	GW	—	—	—	1								X				

Chain of Custody Page 1 of 1

Pace Analytical® National Center for Testing & Innovation

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

SDG #

Table #

Acctnum: **CEC**
Template: **T133579**
Prelogin: **P757606**
PM: **526 - Chris McCord**
PB:

Shipped Via: **Courier**

* Matrix:
SS - Soil **AIR** - Air **F** - Filter
GW - Groundwater **B** - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks: WetChem** = *NITRATE*,CHLORIDE,BROMIDE,SULFATE,FLUORIDE Tot/Diss Metals=M6020AP1+Al,Ca,Fe,K,Mg,Mn,Na,B(6010/7470).**

pH _____ Temp _____
Flow _____ Other _____

Samples returned via:
__ UPS __ FedEx X Courier _____

Tracking #

Sample Receipt Checklist
COC Seal Present/Intact: __NP __Y __N
COC Signed/Accurate: __Y __N
Bottles arrive intact: __Y __N
Correct bottles used: __Y __N
Sufficient volume sent: __Y __N
If Applicable
VOA Zero Headspace: __Y __N
Preservation Correct/Checked: __Y __N
RAD Screen <0.5 mR/hr: __Y __N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCL / MeoH TBR	
Philip J. Campbell	1-28-20	10:00			
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: °C Bottles Received:	If preservation required by Login: Date/Time
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: Time:	Hold: / Condition: NCF / OK

APPENDIX D
CEC STANDARD OPERATING PROCEDURES

APPENDIX D
CEC STANDARD OPERATING PROCEDURES

03-02-01 MONITORING WELLS USING CONVENTIONAL PURGING

I. SCOPE AND APPLICABILITY: This procedure is applicable to the sampling of monitoring wells which do not contain free product using conventional purge methodology.

II. PROJECT-SPECIFIC REQUIREMENTS

A. SAMPLE LOCATIONS AND NUMBERING SYSTEM:

B. ANALYTICAL PARAMETERS AND SAMPLE FREQUENCY:

C. FIELD SCREENING AND ANALYSES: *Reference appropriate SOPs.*

D. QUALITY ASSURANCE SAMPLES: *Number and type of blanks and duplicates. Reference SOPs 04-01-01, 04-01-02, and 04-02-01 as appropriate.*

E. FILTRATION:

F. PURGE CRITERION AND DISPOSAL OF PURGE WATER:

G. WELL KEYS: *Indicate whether wells use CEC's standard key*

H. DEDICATED EQUIPMENT: *Indicate whether dedicated pumps or bailers have been installed.*

I. OTHER REQUIREMENTS:

III. METHODOLOGY: Monitoring wells should be sampled progressing from least contaminated to most contaminated to reduce the chances of cross contamination between samples. If a bailer is employed, use new rope for each well.

A. PURGING: Purging is performed to remove static water standing in the well bore, thereby allowing collection of a sample representative of water in the aquifer. Unless otherwise specified in Section II.F., well development may suffice for the purge, so long as the sample is collected immediately following development.

1. Measure the water level from the top of the riser pipe at the pre-marked reference point (SOP 06-01-01).

2. Calculate the purge volume using the data presented in Exhibit 03-02-01 and the criterion presented in Section II.F.

3. Remove the required volume of water using one of the following methods. If the well goes dry, the purge can be considered complete unless otherwise specified in Section II.F. However, attempts should be made to prevent the well from going dry during purging, drying the well disrupts the flow regime and can result in the loss of volatile compounds. Therefore:

≅ If a well is known to have a low yield, it should be purged by bailing.

≅ If a pump is used for purging, adjust the pumping rate to maintain a water column in the well, if possible.

≅ Do not attempt to purge a well to dryness unless it is infeasible to maintain water in the well at a reasonable purge rate.

METHOD A: If the purge criterion is specified on volume of water to be removed:

a. Remove the required volume of water using a submersible pump or bailer. If a pump is used, a check valve must be installed on the pump to prevent pumped water from returning to the well. Begin purging at the top of the water column. Minimize aeration of the water during purging by pumping at a low rate or lowering the bailer gently into the water.

b. Lower the pump or bailer as necessary to continue purging until the well volume criterion is met.

METHOD B: If the purge criteria are specified on stabilization of field analyses:

a. Measure initial water quality by retrieving a sample from the top of the water column using a bailer. Conduct the field analyses specified in Section II.F. Record these results on the Groundwater Monitoring Data Sheet (SOP 07-02-01).

b. Remove one well volume of water by submersible pump or bailer. If a pump is used, a check valve must be installed to prevent water from returning to the well. Begin purging at the top of the water column. Minimize aeration of the water during purging by pumping at a low rate or lowering the bailer gently into the water.

c. After one well volume has been removed, conduct field analyses on the groundwater being discharged. Record results on the Monitoring Sampling Data Sheet.

d. Repeat steps b and c until the purge criteria have been met.

B. SAMPLE COLLECTION: Groundwater samples should be collected immediately after purging , if the well will yield sufficiently. Some low-yielding wells may require time to recover prior to sampling. If the well will not yield a sample immediately after purging, a maximum of 24 hours between purging and sampling is permitted.

1. Collect water from the well by slowly lowering a decontaminated bailer into the water column.

2. Transfer the samples which do not require filtering directly into sample bottles in the following order:

Volatile Organic Compounds
Semi-Volatile Organic Compounds
Pesticides and PCBs
Cations and Anions
Radionuclides
Bacteria.

3. If indicated in Section II.E., filter the required aliquots (SOP 05-03-02 or 05-03-03) and fill those sample bottles.

4. Preserve the samples immediately in accordance with SOP 07-01-02.

5. Conduct field analyses: pH (SOP 05-04-01 or 05-04-04), temperature, specific conductance (SOP 05-04-02), dissolved oxygen (SOP 05-04-03), Eh (SOP 05-04-08), and any other parameters listed in Section II.C.

6. If a dedicated sample bailer was used, return it to the well head. Otherwise, decontaminate the bailer as specified in SOP 01-01-00.

7. Replace the well cap and lock the protective casing.

8. Collect quality-assurance samples specified in Section II.D in accordance with SOP 04-01-01, 04-01-02, and 04-02-01.

9. Decontaminate samples in accordance with SOP 01-01-00.

10. Pack and ship the samples in accordance with SOP 07-01-03. Samples should be shipped on a daily basis and such that holding time requirements (SOP 07-01-02) can be met.

IV. PRECAUTIONS AND COMMON PROBLEMS

A. When using a bailer, do not allow the rope to drag on the ground. If necessary, lay out plastic sheeting to catch the rope.

B. When using a pump, exercise caution to prevent cross-contaminating samples with the hose. Do not sample from the pump discharge for trace organic compounds. Always use a check valve if not using a dedicated hose. Discard hose if there is a question about whether it can be adequately decontaminated.

C. Check the holding times on the analyses to be conducted. The holding time for some parameters is 24 hours. Plan sampling and shipping of these samples accordingly.

D. Preserve samples immediately after collection, including keeping them cool. Do not let samples sit in a hot vehicle until the end of the day.

V. DOCUMENTATION

A. Record information on a Groundwater Monitoring Data Sheet (SOP 07-02-01).

B. Prepare a Trip Report (SOP 07-02-04) and include:

- ≅ Time, date, and method of sample shipment
- ≅ Preservation methods and sample handling
- ≅ Description of purge and sampling methods
- ≅ The Groundwater Monitoring Data Sheet.

VII. REFERENCES

None

04-01-01 EQUIPMENT BLANKS

I. SCOPE AND APPLICABILITY: Equipment blanks are collected to assess the adequacy of decontamination procedures and to determine whether sampling equipment and methods are contributing contaminants to samples.

II. PROJECT-SPECIFIC REQUIREMENTS:

WATER TYPES TO BE USED FOR BLANKS: *[distilled water, deionized water, HPLC-grade water, etc.]*

III. METHODOLOGY

A. Review the SOP for the medium sampled to establish the frequency for collection of blanks.

B. Assemble a complete set of decontaminated sampling equipment for the subject sampling effort.

C. Rinse the blank water across the sampling equipment, catching it in a decontaminated stainless-steel bucket. Handle the water in the same manner as the samples. For example, if samples for metals analysis are to be filtered with a disposable filter, the blank aliquot for metals analysis should be processed through a new disposable filter. Blanks for soil sampling may be run across the split-spoon sampler, trowel, and bucket.

D. Fill a complete set of sample bottles.

E. Assign the blank a sample number of the same format as the other samples in the series.

F. Store, handle, and ship the blanks in the same manner as the samples.

IV. PRECAUTIONS AND COMMON PROBLEMS

A. The selection of stock solution depends upon the requirements of the project. Analyses for trace contaminants will require a purer blank solution than analyses for major constituents. Stringent analytical requirements will necessitate the use of laboratory-supplied blank water.

B. Include ALL sampling equipment in the rinsing procedure.

V. DOCUMENTATION: Record the following information in the field logbook:

- ≅ Source of blank water
- ≅ Time and sequence within the sampling event when the blanks were prepared
- ≅ Description of the procedure for preparing the blanks
- ≅ Sample numbers assigned to blanks.

Incorporate this information into the Trip Report (SOP 07-02-04).

VI. REFERENCES

EPA, 1986. Test Methods for Evaluating Solid Waste: SW-846; Volume II. Washington, DC.

04-01-02 TRIP BLANKS

I. SCOPE AND APPLICABILITY: Trip blanks are prepared to evaluate whether volatile constituents have migrated into samples from the air on-site, during shipping, or at the laboratory.

II. PROJECT-SPECIFIC REQUIREMENTS:

A. Frequency:

B. Other Criteria:

III. METHODOLOGY

A. When ordering bottles from the laboratory for the sampling event, request that trip blanks be sent also.

B. Keep the supplied blanks with the samples being collected throughout the sampling event. Handle the blanks in the same manner as the filled sample vials.

C. Assign the trip blank a sample number of the format used for the sampling event.

D. Return the trip blanks to the laboratory with the samples. Include the samples on the Chain-of-Custody form (SOP 07-02-02). Analysis is typically performed for volatile organic compounds only.

IV. PRECAUTIONS AND COMMON PROBLEMS: None.

V. DOCUMENTATION: Describe handling on the trip blanks in the Trip Report (SOP 07-02-04). Include the sample numbers assigned.

VI. REFERENCES

EPA, 1986. Test Methods for Evaluating Solid Waste: SW-846; Volume II. Washington, DC.

04-02-01 LIQUID DUPLICATES

I. SCOPE AND APPLICABILITY: Duplicate samples are collected to evaluate the precision involved in the sampling effort. Duplicate samples must be collected to be as similar as possible to the original sample. This procedure is applicable of collection of duplicate samples of all liquids and flowable sludges.

II. PROJECT-SPECIFIC REQUIREMENTS:

NUMBER/FREQUENCY OF DUPLICATE SAMPLING:

DUPLICATE NUMBERING SYSTEM: *[Indicate how sample numbers are to be assigned to duplicates, and whether "blind" numbers should be assigned.]*

III. METHODOLOGY

A. Prepare sample bottles for the target sample and its duplicate.

B. Collect the liquid sample in accordance with the appropriate SOP.

C. When filling sample bottles, fill each type of bottle for the sample and duplicate in sequence. Fill both VOA vials, then both metals bottles, etc. This will assure that the duplicate is as similar to the original sample as possible.

D. Preserve the sample and duplicate identically.

IV. PRECAUTIONS AND COMMON PROBLEMS

A. Failure to fill bottles alternately between the sample and duplicate may result in poor reproducibility between analyses.

B. Samples with free product or multiple phases present special problems. The phase distribution must be the same in both aliquots.

V. DOCUMENTATION: List the sample and duplicate on the Groundwater Monitoring Data Sheet as separate samples, describing the duplicate in the "Comments" column. If a Groundwater Monitoring Data Sheet is not appropriate, incorporate this information into the Trip Report (SOP 07-02-04).

VI. REFERENCES: None.

05-03-05 BAILER

I. EQUIPMENT SPECIFICATION: This procedure is applicable to the use of all bottom-fill bailers.

II. INSPECTION AND CALIBRATION

A. DAILY INSPECTION AND CHECKS: Make sure fittings at both ends of the bailer are secure. Assure that the check valve opens and closes freely.

B. CALIBRATION: There is no calibration applicable to this equipment.

C. ROUTINE MAINTENANCE: There is no maintenance applicable to this equipment. Bailers are typically replaced if damaged.

III. USE

A. Select a rope or cable for suspension of the bailer which is appropriate to project requirements. Typically, small gauge nylon rope is used, although stainless-steel cable may be used when samples will be analyzed to very low detection limits. The rope or cable should be new and clean. Do not use materials which have been used on another project, as this may result in cross contamination.

B. Consult the Project Manager to select a bailer composition which is compatible with the anticipated groundwater quality. For most applications, PVC bailers are adequate. Stainless-steel may be used where very low levels of organic compounds are of interest. Teflon bailers are available and may be requested on some projects.

C. Using a strong, non-slipping knot, such as a bowline, tie the rope or cable to the top of the bailer.

D. Lower the bailer into the well. Do not let the bailer free-fall down the well, as the device may shatter or the ball valve may become dislodged upon striking the water or the bottom of the well.

E. Raise the bailer by pulling the rope with a smooth, uniform motion. A jerky motion may open the check valve, resulting in water loss. Check the knot periodically.

Do not allow the bailer rope to drag on the ground. Place plastic sheeting on the ground to keep the rope clean if conditions are muddy, the ground surface is contaminated, or very low levels of contaminants are of interest.

IV. DECONTAMINATION: The equipment should be decontaminated in accordance with SOP 01-01-00.

Typically, the bailer is washed with a potable water and non-phosphate soap solution. The bailer is then rinsed with distilled water and wrapped in plastic or foil until used.

V. TROUBLESHOOTING

A. If the knot should come undone or the rope breaks, the bailer typically can be recovered using a weighted fishing hook tied to monofilament line.

B. When bailing turbid water, it may be necessary to rinse the ball-valve at the bottom of the bailer with distilled water if it clogs.

06-01-01 WATER-LEVEL MEASUREMENT IN MONITORING WELLS

I. SCOPE AND APPLICABILITY: This procedure is applicable to the measurement of water levels in monitoring wells and open boreholes.

II. PROJECT-SPECIFIC REQUIREMENTS

A. REQUIRED READINGS:

B. APPLICABLE METHODS:

III. METHODOLOGY: Water levels should always be recorded to ±0.01 foot. Measurements should be made from a marked point on the inner casing for monitoring wells, and from the ground surface for open boreholes. Equipment should be decontaminated in accordance with SOP 01-01-00 after each measurement. The following methods may be used:

A. CHALKED-TAPE METHOD

1. Check records for historic water levels in the well, if available.

2. Rub the first five feet of a steel surveyor's chain or fiberglass tape with carpenter's chalk.

3. Lower the tape into the well until the end of the tape enters the water.

4. Record the tape footing at the wellhead to within 0.01 feet.

5. Pull the tape out of the well and read the tape footage of the water mark to within 0.01 feet. The difference between the readings is the water level.

B. SOUNDING

1. Attach a small float or hollow-bottom weight or sounder to the end of a tape measure.

2. Lower the sounder into the well and listen for the sound of the weight hitting the water surface.

3. When this is heard, pull the sounder back a few inches and redrop it by 1/4-inch increments until the sound is heard again.

4. Subsequent smaller increments of lowering the sounder will allow water-level measurements to within 0.01 feet.

5. Measure the length from the zero mark on the tape measure to the bottom of the weight. Add this value to all field measurements made with the sounder.

C. ELECTRIC-WATER LEVEL METER (Solinst)

1. Turn the Solinst on by turning the knob clockwise. This knob is also the volume control. Test the Solinst to see if the battery is dead by pushing the button next to the volume knob.If the battery is charged the Solinst will emit an audible tone and the red indicator light will illuminate.
2. Lower the end of the probe into the well or borehole. The probe will cause the unit to emit the tone and illuminate the light when it contacts water.

3. Pull the probe back a few inches and lower the probe in smaller increments until the water level is measured to within 0.01 feet.

4. The water level is read directly from the Solinst tape, and already includes a correction for the length of the probe on the bottom of the tape.

D. INTERFACE PROBE: This is the only reliable method for wells with floating free product.

1. Push the On/Off button to turn unit on. Lower the probe into the liquid. The horn will sound a steady tone and the yellow light will illuminate when the probe contacts an oil product. Slowly raise probe until sound stops, lower until sound is heard again to refine the oil level.

2. Read the tape marking and note as the surface level of product.

3. Slowly lower the probe through the oil product, searching for the oil-water interface. When the probe reaches water the tone will switch from steady to a beeping tone and the red light will illuminate. Slowly move probe up and down to refine the oil/water interface to within 0.01 feet. Read the water level directly from the tape. The length of the probe is already considered.

NOTE: Auto Shutoff Feature: After approximately five minutes of power on, the unit will auto-shut off. A chirping sound will be heard, warning impending shut off. Press

<POWER ON/RENEW> to continue operation. During five minute interval, short "alive" beep is heard.

IV. PRECAUTIONS AND COMMON PROBLEMS:

1. Be sure to allow sufficient time after development, purging or pumping to allow the well to recover to static conditions.

2. Sounding may be difficult with very deep water levels or in noisy conditions because the sound is hard to hear.

3. Measurement of water levels in pumping wells or wells/boreholes with cascading water can be difficult. Installing a narrow PVC access tube inside the well casing can make obtaining accurate readings easier.

4. Free product floating on the water table depresses the natural water level. If a true water level is required, the product of the oil thickness and the oil specific gravity must be added to the oil/water interface elevation.

5. If there is no measurement mark on the well riser, add one in indelible ink.

V. DOCUMENTATION

1. Record water levels in a field notebook or Groundwater Monitoring Data Sheet (SOP 07-02-01). Be sure to record the date and time of the measurement.

2. Data should be incorporated into the Trip Report (SOP 07-02-04). Method of measurement should be reported.

VI. REFERENCES: None

07-01-01 MAINTAINING SAMPLE CHAIN OF CUSTODY

I. SCOPE AND APPLICABILITY: This procedure is to be employed whenever samples are collected for laboratory analysis, and is designed to ensure that sample integrity is maintained. These procedures are necessary to assure that samples are defensible.

II. PROJECT-SPECIFIC REQUIREMENTS: None.

III. METHODOLOGY

A. SAMPLE CUSTODY: The sampling personnel must maintain custody of the samples until they are delivered to the laboratory, at which time the laboratory takes over the custody record. A sample is considered to be in custody if:

- it is in the investigator's actual possession
- it is in view of the investigator
- it has been placed in a secure area
- a signed custody seal has been placed on the sample container such that the seal would be destroyed if the container was opened.

B. CUSTODY RECORD

1. Complete a Chain-of-Custody Form for each shipping container of samples as described in SOP 07-02-02. Place the white copy of the completed form in the shipping container with the samples, as discussed in SOP 07-01-03.

2. Affix a signed custody seal to secure all samples. Seals may be placed across the lids of individual sample bottles, or on each shipping container of samples. If seals are placed on shipping containers, at least two seals must be used, and they must be placed such that the container cannot be opened without breaking the seals.

IV. PRECAUTIONS AND COMMON PROBLEMS

A. It may be necessary to cover custody seals with clear postal tape to prevent them from falling off.

B. Deliver or fax a copy of the custody form to the Project Manager within 24 hours of shipping the samples so that any errors can be corrected before the laboratory begins processing the samples.

V. DOCUMENTATION

A. The pink copy of the Chain-of-Custody Form should be submitted to the Project Manager as soon as possible after the samples are shipped.

B. The Project Manager or a designee must review the form for completeness and correctness. Any errors should be flagged, and the laboratory should be contacted if errors could affect analysis. The reviewer should initial and date the form, then place it in the Project File.

C. Compliance or problems with custody procedures should be documented in the Trip Report (SOP 07-02-04).

VI. REFERENCES

EPA Region IV; 1991. Environmental Compliance Branch, Standard Operating Procedures and Quality Assurance Manual. Athens, Georgia.

07-02-01 GROUNDWATER MONITORING DATA SHEET

I. SCOPE AND APPLICABILITY: A Groundwater Monitoring Data Sheet is completed each time water samples are collected to document field data and sampling methodology.

II. PROJECT-SPECIFIC REQUIREMENTS: None.

III. METHODOLOGY: Complete the form (Exhibit 07-02-01) as samples are collected, as follows:

a. Self explanatory
b. CEC project number
c. Names or initials of all members of the sampling team
d. Complete well designation
e. Depth to water level, reported to $\pm$0.01 ft. (Check measurement datum at the top of the column.)
f. Date and time well purging is started
g. Volume of water removed, in gallons
h. Check if well was purged to dryness
i. Indicate method of purging, such as submersible pump or bailer
j. Date and time that the actual sample was withdrawn. If sample bottles were filled at multiple, separate times, these should all be indicated.
k. Self explanatory (Check units for temperature.)
l. Unusual odors or other observations
m. Other atypical information, such as special handling of purge water or field problems

IV. PRECAUTIONS AND COMMON PROBLEMS: All information required by the form must be provided.

V. DOCUMENTATION: Attach the form to the Trip Report (SOP 07-02-04).

VI. REFERENCES: None.